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How Governments Support Innovation through Public Procurement Comparing Evidence from 11 Countries

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Abstract

This paper summarizes the main findings from the 11 country chapters presented in our forthcoming edited volume, *Public Procurement, Innovation and Policy: International Perspectives* (Springer, 2013); the paper appears in the book as the concluding chapter. We categorize the current public procurement of innovation (PPI) policy practices and explore the factors behind policy developments. Although countries have followed rather different paths in PPI policy-making, we detect a certain general PPI trajectory over the past three decades – while during the industrial policy era up until the 1980s public procurement was mostly used to induce new technologies and entire industries via direct public technology procurement programs as well as R&D procurement, the emerging policy consensus puts an emphasis on more holistic ideas and sees public procurement as a more generic tool in promoting innovation. We conclude, however, that today there is no single dominant policy approach governments follow and that the actual PPI policy measures implemented are still cautious and indirect rather than substantial and direct, and that the very process of public procurement plays a far more modest role in the actual implementation of PPI policies than expected.

14.1 Introduction

Our focus in this book is, first of all, on exploring the evolution and development of innovation-relevant public procurement policies in different country and regional settings and, secondly, on analyzing the evolution and development of the various policy solutions in wider institutional contexts. In this chapter we address these questions by synthesizing empirical evidence from the country case studies presented above. As the evolution of public procurement of innovation (hereafter PPI) policies in every country is embedded in a specific institutional context, it becomes inevitable to understand the factors affecting the institutionalization of PPI policies.

To analyze the findings from the country studies, and taking into account the fact that public procurement is one of the state's basic administrative functions at all levels, we use a modified and simplified framework widely used for comparative analysis of administrative policy-making in public administration and public policy studies (see Christensen and Laegreid 2007, Pollitt and Bouckaert 2011, Verhoest et al. 2010). We develop and apply the framework to the context of PPI and analyze the impact of various environmental and institutional factors on the evolution of related policies in the 11 countries covered in the book. More specifically we will

base the overview on three analytical levels: international pressures, country-level socio-economic factors and policy-level factors (Table 14.1). After summarizing the situation in PPI policies in various countries, we will first explore how the depth and spread of such policies – as well as similarities and differences in policy-making – is affected by international pressures. This includes globally competing ideological and paradigmatic principles (for instance, neo-liberalism vis-à-vis innovation policy thinking) and international regulatory and trade regimes (such as World Trade Organization’s (WTO) agreement on public procurement, bi- and multi-lateral trade agreements). Second, we will analyze how PPI policy evolution is influenced by the general economic background and the developmental stage as well as national innovation systems of a country. This is complemented by insights into state structures and political preferences. Third, we will look at the effects of policy contexts – the general public procurement system and values as well as formal and informal support institutions towards the actual situation and developments in PPI.

Table 14.1 Framework for mapping factors shaping PPI policies. (Authors’ elaboration based on Christensen and Laegreid 2007, Pollitt and Bouckaert 2011, Verhoest et al. 2010)

| Analytical level | Institutional factor |
|----------------------------|---|
| International pressures | Normative (administrative, economic and innovation-policy paradigms), regulatory (trade), economic (globalization) pressure |
| Socio-economic environment | Economic background and development (market capabilities), national innovation system |
| | Polity (state structure, political system and preferences) |
| Policy context | Public procurement system and values |
| | Public procurement of innovation support institutions |

Considering the dearth of previous analyses on PPI policy-making and the fact that the relationship between public procurement and innovation covers a very broad area in public policy-making, the present comparative overview is necessarily cursory and can only provide preliminary insights into the subject matter. Furthermore, due to a lack of adequate data it was not possible to cover many important aspects in the book. For example, in order to assess the potential of PPI, more in-depth studies are needed to explore the structures of the public procurement markets and how they correspond to the overall economic structure of a country. Also, currently there are no good indicators available or studies done that would make it possible to evaluate the outcome of various PPI policies.

14.2 Public procurement of innovation policy: a comparative overview

Governments have historically pursued very different policies in targeting innovation through public procurement. As argued in Chap. 2, one could expect to see four distinguishable policy approaches in action that use public procurement as a vehicle for innovation: PPI as technology (industrial) development policy, PPI as R&D policy, generic PPI policy (so-called “policy for all seasons”), and PPI as a “no policy” policy. The country cases presented in this volume indicate that governments indeed use a variety of policy measures, often in conjunction with other instruments, and that the initial taxonomy offered in Chap. 2 can be reasonably well applied to describe the past and current PPI policy developments (Table 14.2). Still, the categorization of the policy programs and instruments identified is necessarily arbitrary as pure cases are rare in reality. The next sections give a detailed discussion of each PPI mode in the context of case studies discussed in the book.

Table 14.2 Selected examples of innovation-relevant public procurement policy approaches and instruments. (Authors based on Chap. 3 to 13)

| Country | PPI as technology and industry development policy | PPI as R&D policy | Generic PPI policy | "No policy" policy |
|-----------|---|--|--|-----------------------|
| Australia | Various defense technology projects (since 1970s); high-tech industry Partnerships for Development (1987); Priority Industry Capabilities program in defense (2009) | Defense: Capability Technology Demonstrator Program (1997), Rapid Prototyping, Development and Evaluation Program (2004); Victorian Government's Smart SMEs Market Validation Program (2009) | Promotion of innovation principles (in Procurement Guidelines; establishing communication platforms with industries; targeted training) (2008) | |
| Brazil | Petrobras supply-chain; Profarma Inovação (pharmaceuticals) (2008); various technology programs in defense | FINEP | Exclusive and supportive regulative provisions (2010) | |
| China | Products Catalogue of Independent Innovation for Public Procurement; Listed Energy Efficient Products for Public Procurement | | | |
| Denmark | Public-Private Innovation Partnerships in social sector; Laboratory for Public Private Innovation Project (2011) | | Best practice sharing via web-based guidance tool for PPIs (2012); | |
| Estonia | | Minor program in defense | | Prevalent policy mode |
| Greece | | | | Prevalent policy mode |
| Hong Kong | | Public Sector Trial Scheme | | Prevalent policy mode |
| Korea | New Technology Products Program; Green Technology Product Program; Alternative Bidding and Design-Build (Turn-Key) Bidding in construction | Industrial Technology Development Program; KOSIBIR | | |
| Sweden | Market-transformation programs in energy; technology-procurement strategy in Swedish Transport Administration; Vattenfall and the Swedish Association of Local Authorities and Regions procurement program of electrical cars | VINNOVA's pre-commercial public procurement program | VINNOVA's promotion program; Swedish Agency for Economic and Regional Growth. 'Learning public procurement of innovation' | |
| UK | Forward Commitment Procurement; Innovative Technology Adoption Procurement Programme | Small Business Research Initiative | Innovation-procurement plans (discontinued since 2011); Public-Private Procurement Compacts | |
| USA | Myriad of programs on federal level (e.g. Building Technologies Program and Federal Energy Management Program under the Department of Energy, In-Q-Tel under CIA etc.) | Myriad of programs on federal level (e.g. SBIR; R&D competitions etc.) | | |

14.2.1 PPI as technology and industry-development policy

Using policy instruments to develop and diffuse new technologies through public procurement has been historically one of the most prominent PPI policy choices by governments, and moreover, it has often had direct bearing on industry development (see Chap. 2). Although somewhat complicated to track down empirically – these kinds of initiatives are often not perceived as related to innovation and/or public procurement policy domains – such policy tools are evident in the countries studied (Table 14.2).

A part of this policy – already widely recognized by the existing literature – aims directly at developing specific new products based on demand identified and articulated by the public sector. Often referred to as “public technology procurement”, these policy initiatives are introduced to meet governments’ direct needs (e.g., New Technology Products Program in Korea), endorse some socially desired technologies (e.g., market-transformation programs in energy in Sweden and the US) or promote some strategic industry sectors out of competitiveness reasons (e.g., pharmaceutical industry development in Brazil, Priority Industry Capabilities program in defense in Australia).

Some countries have introduced direct legal provisions for supporting new technology via public procurement. For example, Brazil has set an overpricing rate of up to 25% for innovative local products, whereas in Korea 10% of each public institution’s SME product purchases should go to New Technology Products.

It is important to note that in spite of the rhetorical shift away from industry-support policies towards more generic and horizontal innovation policies, the infant-industry-creation argument at least in policy plans still plays a central role in many of the policy choices presented in the book (especially in areas where the need to sustain domestic technology capabilities is perceived as crucial to tackle social challenges (e.g. security in Australia and USA) or economic development (oil supply-chain in Brazil)).

Public procurement programs aiming at supporting innovation and the competitiveness of SMEs and developing environment-friendly technologies play an increasingly important role in many countries studied as well. While not always directly targeting innovation, many of the contemporary SME public-procurement programs do feature strong innovation elements in countries as different as Australia, China, Korea, Sweden and the US. Environment-friendly public procurement involves innovation elements almost by definition and has gained more prominence over the past few years in many countries.

Somewhat less attention has been given in the current literature to the way public procurement is systematically employed as an additional or indirect innovation driver in conjunction with other policy instruments to introduce new technologies or upgrade technology-intensive sectors. The country studies indicate that such indirect applications include various possibilities:

- Motivating (and sometimes forcing) public-sector suppliers (especially Multi-National Corporations (MNC)) to establish innovation and R&D linkages with domestic technology firms in order to qualify for public tenders. As an example of innovation linkages employed in the PPI context, as described in Chap. 3, Australia launched the Partnerships for Development program in 1987, where MNCs bidding for government contracts in strategic industries (e.g., ICT) were encouraged to sign long-term agreements to meet R&D and export targets, in collaboration with local companies. This initially mandatory requirement was replaced by more general guidelines in 2002. One can also find similar practices in Brazil (Chap. 4).
- Identifying and communicating future public-sector capability needs and possible contracting opportunities to the market. These tendencies are most prominent in areas such as defense, security and ICT. Signaling the needs to the industry with the possibility of future procurements is practiced most notably in Australia, the UK and the US, but also in Korea and China. However, in spite of the efforts, industries tend to remain rather skeptical about the progress and effectiveness of such newly introduced practices.
- Using public venture capital funds to invest in technology startups capable of becoming suppliers to the public sector. This novel strategy has gained prominence, for example, in the US where the CIA-run In-Q-Tel fund or the Army's OnPoint Technologies both serve the government needs in the security area (see Chap. 13). On the one hand this particular tendency demonstrates the limits the often cumbersome public-procurement procedures have on calling innovations into existence, but at the same time it vividly demonstrates the continuous importance of the public sector as a launching customer of innovations.
- Matching public technology procurement with other innovation support measures such as R&D grants. This is a theme that will be dealt with in more depth in the next section.

14.2.2 PPI as R&D policy

Specific R&D oriented public procurement policies are gaining grounds in many countries reviewed in the current volume. Largely influenced by the US experiences with the SBIR program (see Chap. 13), Australia, Korea, Sweden and the UK are among the countries that have adopted their own versions of R&D or pre-commercial procurement schemes. Denmark and Estonia have introduced public R&D procurement on a somewhat smaller scale. In addition to the countries explored in this book, other countries are following the path: Finland, Japan, the Netherlands, Russia and Taiwan, to name just a few (Wessner 2008). Further, the EU is developing its own pre-commercial procurement initiative that would match the alleged US SBIR success.

It can be concluded from the country chapters that public procurement of R&D often needs to balance between technology “pull” and “push”, and the link between the public R&D procurement and actual public purchasing of end-products is not always that straightforward (see also Edquist and Zabala-Iturriagoitia 2012). It is not always entirely clear what is the actual driver of these schemes – whether it is the demand or supply that guides the process and whether public sector actually make use of these schemes itself. In some occasions the link between R&D procurement with eventual procurement and the use of developed products has remained weak (e.g., the Estonian defense initiative, Chap. 7), and it is the technology push from the private and academic actors that actually drives the policy instrument rather than government needs. On other occasions the R&D procurement is directly driven by the government-established demand with a clear purpose for the public sector to eventually use the developed products, e.g. in the case of Australia’s defense programs and partly the US SBIR. However, it remains one of the main features of the R&D-oriented schemes that the eventual public procurement is an indirect rather than a direct incentive for providers to carry out R&D work: Under SBIR-type instruments governments are not obliged to buy the developed products, but, as underwritten by an US SBIR Policy Directive “whenever practicable, an innovation or technology developed by an SBIR business will be used by the government” (Chap. 13). All in all, the connections between R&D and actual PPI under SBIR-type schemes tends to be determined by the policy practice and administrative routines, which vary from country to country.

The practice is strongly influenced by the will and capacity of governments to articulate the demand for R&D intensive solutions in a concrete way and by the modus how different parts (or potential future clients) of the public sector are integrated within the policy cycle. If the demand is articulated in broad terms and potential public-sector clients are poorly

integrated into the initiatives then the role of public procurement as a demand instrument of innovation policy remains weak. At the same time, if public demand is described in a manner that carefully follows the identified needs, the public sector or other future clients are closely integrated into the initiatives and the rate of eventual purchases of the developed products is high, public procurement as an R&D policy can play an important role in a country's overall innovation policy.

Several reasons can be identified why countries' policy practice may differ in R&D-related PPI. First of all, there is a natural uncertainty with regard to technology development, its future trajectories, possible lock-ins and related costs, which, coupled with a lack of expertise in the public sector, may prevent government from signaling and forming a clear demand. Secondly, there can be a strong legacy of relying on supply-side innovation-policy measures, which means that the policy-makers may have a tendency to prefer instruments similar to supply-side support rather than going for clear demand-side tools (see e.g. the case of the UK in Chap. 12). Thirdly, in case of low government policy and administrative capacity, a newly introduced PPI policy measure can be easily captured by well-organized stakeholders (e.g., academic or business communities) and consequently the entire policy may fail to meet its goals (see e.g., the case of the Estonian defense R&D procurement, Chap. 7, or the case of the contracting program with the SME Federation in Korea, Chap. 10).

Nevertheless, the international evidence demonstrates that PPI policy that links institutionalized and public demand-driven R&D to actual public purchasing enables the public and private sectors to engage in close (pre-tender) collaboration that has proven to be a bottleneck of traditional open auctions and restricted tender procedures aiming at bringing about innovation impacts. In this way coordinated public R&D procurement schemes have proven to be useful and effective (not always, though) mechanisms in making the most out of the public-procurement potential to spur innovation.

14.2.3 Generic PPI policy

A generic PPI policy ("policy for all seasons") approach – aiming at making the innovation dimension a central and explicit part of procurement decisions across the public sector – presents the latest attempt to use public procurement to tackle systematic problems in national innovation systems. Although the generic approaches are not entirely new endeavors for governments (see Chap. 2), governments have in the past few years increasingly brought up this issue and introduced new policy measures to meet the innovation challenges. Examples include the direct

incorporation of innovation-friendly regulative provisions into the legislation (Brazil, China, US), knowledge dissemination and promoting innovation as an important side-goal of public procurement (Australia, Denmark, Korea, Sweden, the UK), establishing communication platforms with industries for pre-selection stages (Australia, the UK), dedicated funding schemes (Sweden) and targeted training (Australia, Sweden).

In most cases the generic PPI policy measures are voluntary (or so-called “soft”) in their nature, aiming at altering the prevailing public procurement practice and values rather than at concentrating directly on systemic problems in innovation systems. It is already quite well documented in various case studies in the field, but also in this book, that public procurers are generally risk-averse and tend to be process- rather than outcome-oriented. This is generally considered to be if not innovation-hostile then at least innovation-neutral behavior that is deeply rooted in the currently dominating public-procurement culture.

As the generic policies are relatively new (most date back to late 2000s), no systemic outcomes can be reported yet. However, judging by cases presented in this book, public agencies are in fact hesitant to use such a powerful policy tool even if direct legal support mechanisms are put in place. For instance in Brazil such a specific provision exists in the law that allows to positively discriminate innovative products against non-innovative ones, but this provision has not been employed by public agencies (see Chap. 4). The UK is probably one of the most advanced countries in Europe in promoting generic as well as other PPI policies; however, the practice still lags behind policy ideas (see Chap. 12). Other countries, such as Denmark, even if implementing preliminary schemes, have deliberately avoided providing official PPI guidance for the public sector (see Chap. 6). Perhaps the one outlier here is China that seems to rather aggressively pursue generic PPI policy, but again, no major outcomes can be reported yet as the policy as well as supportive legislation have only just taken effect.

14.2.4 “No policy” policy

In all countries studied in the book public procurement is mostly still a matter of auctioning for existing products and services based on the lowest-price criterion. Accordingly, we can argue that the “no policy” policy in PPI is essentially a starting point for all other possible PPI modes in all countries. What differs from country to country is how governments have diverged from the “no policy” policy towards others policy modes, and why they have done so, and how these other modes have changed over time. Yet, there are also countries that prefer to use “no policy” in PPI through their procurement practices.

The “no policy” policy does not make any specific provisions for innovation in procurement activities. This does not mean that governments do not pursue innovation-driving public purchases, but it has been a conscious choice of the governments not to develop explicit policies for PPI. Rather, in such cases governments prefer procurement policies that are efficiency-driven and thus part of a general economic policy landscape where perfect competition is seen as the driving force of innovation. In other words, it is acknowledged that also procurement activities should foster competition in economy and this then should lead to more innovative activity in the private sector. From our case-study countries, Estonia, Hong Kong and Greece clearly fall under this category. In these countries outstanding PPI success cases exist, but the respective governments have not designed specific policy devices to address the innovation potential of public procurement in a systematic way.

What remains one of the problems with the “no policy” policy is that the innovation potential and actual effects remain unnoticed, making learning and best-practice diffusion difficult to happen (see Chap. 8 for this point). Also, concerns have been raised throughout the book if the “no policy” approach stressing only the traditional values of public procurement is effective towards innovation (e.g., Chap. 3, 7, 8, 12).

14.3 Factors driving PPI policies

Considering the size of contemporary public-procurement budgets (see Chap. 1), it may seem almost self-explanatory that public purchasing should be capable of affecting the innovative behavior of supplier organizations. All the countries reviewed in the current book have – in one way or another – recognized that potential, but have, however, followed rather different paths in addressing that issue: the evidence provided in the previous section and throughout the current book shows that the actual policy-making in promoting innovation through public procurement in various countries has been hectic with many parallel trajectories, driven by various logics and pursued through different approaches. And here, as with any other policy field, the choice, implementation, continuity and discontinuity of PPI policies only seldom reflect rationally calculated and planned processes, but rather it reflects the struggles between competing ideas that are nurtured and developed in specific institutional environments.

Nevertheless, we also find that at least on the policy level – especially in policy talk and intentions – we can detect a certain general PPI trajectory over the past three decades. In other words, it follows from the country cases that on a very general level a common trajectory can be identified that characterizes the overall PPI policy-making regardless of specific

contexts. While up to the 1980s PPI practice and also theory were dominated by technology and R&D specific activities, in the 1990s there was a rather strong turn towards efficiency through increased competition (that is, less government intervention in PPI practices), and since the 2000s we see a turn back towards an emphasis on innovation in PPI practices through generic PPI policy modes. Figure 14.1 summarizes the general policy trajectory.

Fig. 14.1 Overall public procurement of innovation policy trajectory. (Authors)

In what follows, we outline some of the factors that could have played a role in shaping the trajectories of PPI policies, both overall as well as in the countries studied, based on the framework outlined at the beginning of the chapter (see also Chap. 1).

14.3.1 International pressures for isomorphism

The 1990s witnessed a historic move from industrial to innovation policy (see Chap. 1 and 2). This historic move took place at a time when the “level playing-field” paradigm had become a dominant model in public procurement, especially among the developed world. By the 1990s industrial-development-oriented public procurement was more or less equaled with discriminatory procurement and was thus deemed to be counteractive to economic development. These changes took place in a context where the noninterventionist ideas had become a dominant doctrine in overall economic policy-making and affected most of the countries (Soete 2007) and especially small states (Kattel et al. 2010). In addition to the shifted focus towards macroeconomic stability, the neoliberal ideas also heavily influenced the administrative policy-making. With the emergence of the New Public Management (NPM) concept, the quest for a smaller and more business-like public sector gave a strong impulse for outsourcing, which put public procurement at the center of the NPM reforms. Supported by the international trade regime (e.g., WTO GPA, the EU single market), the quest for enhanced short-term efficiency became the single dominant goal for contracting for public works, goods and services, making side-goals such as industrial development or innovation largely irrelevant.

Such **normative pressures** – with a shift in economic, administrative and innovation policy-thinking – has had a strong influence on policy initiatives and created persistent policy paths. Many of the countries covered in the book used to employ a rather diversified set of innovation-related public-procurement policies up until the 1980s and 1990s, which were generally either abandoned or lost in significance in 1990s. This was clearly the case in countries with rather different contexts such as Australia, Brazil

and Korea, and perhaps most visibly evidenced in the EU countries, where innovation-oriented public procurement had become almost a “non-issue” by the 1990s. For instance, technology-intensive public procurement used to be a more common and explicit policy measure in Sweden in the 1990s, but decreased in significance after Sweden joined the EU in 1995 (Chap. 11). Similar trends also appeared in Greece (Chap. 8).

At the same time, there are countries like Estonia and Hong Kong which have historically relied mainly on neo-liberal economic and administrative policy doctrines and accordingly have always opted for a “no policy” policy approach in PPI.

The US presents a paradox here: It is generally regarded as being one of the strongholds of neo-liberal thinking and accordingly has never attempted to formulate a state-wide and explicit PPI policy. Nevertheless, the US has been historically – and still is – one of the leading countries when it comes to exploiting public procurement for the sake of innovation. Largely pursued within the sectoral/technology and R&D policy domains and embedded in the national-security state framework, the US federal government has actively implemented various PPI policy measures and has effectively resisted the normative-ideological pressures downplaying government intervention in many public areas (Chap. 13).

In addition to the isomorphic processes in general economic and administrative policy-making, the legacy of innovation-policy doctrines has been another central factor determining PPI policy evolution. The prevailing supply-sidedness in innovation policy-making (instruments such as R&D grants or tax reductions) has simply left the demand-side unnoticed in many countries for a long time (e.g., Brazil, Denmark, Estonia, Greece). In addition, many of today’s PPI policy initiatives build on the existing supply-sided capabilities and thinking, which in some cases has created a situation where initially public demand-oriented initiatives fail to introduce proper demand-led incentives and only seldom lead to actual public purchasing of innovations (e.g., the UK’s SBRI program, the Estonian defense R&D procurement program). The experience of the UK summarizes this situation well:

It is not then surprising that a large amount of attention has focused on the SBRI scheme which falls most easily into the research funding paradigm. To its credit the agency has sought to partner with sectoral ministries in this area and with its innovation platforms but the net result is a small share of already small budgets and little impact on the real prize – the multi-billion national spend on procurement of goods and services. (Chap. 12)

The institutional set-up of national public procurement systems has become increasingly similar across countries over the past couple of decades. This evolution has been in addition to the above-mentioned normative pressures facilitated by the developments in the **international trade regime**. Public procurement has become an important international trade issue, which has led to increasingly similar public procurement rules and behaviors of public procurers, especially among the signatories to the WTO GPA (41 altogether, the majority being from the developed world; Denmark, Estonia, Greece, Hong Kong, Korea, Sweden, the UK, USA from the countries covered in the book), the EU member countries (all are signatories to the WTO GPA, but the EU single-market policy is in many ways even more restrictive) and countries that have bi- or multi-lateral free trade agreements covering public procurement beyond WTO GPA (Australia). Also China – expected to join the WTO GPA soon – is experiencing a strong pressure to change its public procurement rules in accordance to the international trade rules. The international free trade movement has facilitated the establishment of international public procurement standards – building on openness, transparency and non-discrimination – which is also embraced by countries that have opted out from WTO GPA or similar agreements and maintained policy freedom in public procurement (e.g., Brazil).

The convergence in public procurement regulation has taken place at a time when government purchasing was increasingly seen as unsuitable for promoting side policies such as industry or innovation and when some, previously heavy users of PPI, such as Sweden, gradually abandoned the usage of the tool. This has led some commentators to suggest that the current WTO-EU type of public-procurement regulation contributed to the emergence of risk-averse culture and low use of innovation-oriented public procurement, and subsequently to the decline in active PPI policy-making from the 1980s to the 2000s. The country cases in this book do not indicate that the current formal rules *per se* are responsible for the low use of PPI, but it becomes evident on the one hand that the converging regulations have limited the room for maneuver for countries to pursue PPI policies, and the regulation indeed played a role in creating public-sector culture that is *perceived* as innovation-hostile and on the other hand that today public procurers are better positioned to conduct “price wars” rather than PPI, which assumes cooperation and interaction with suppliers (Chap. 7).

With regard to specific policies, changes in trade regime did force governments to alter some PPI policy-making principles. Instead of deliberately using public procurement in concert with other innovation and industry policy instruments, more indirect and “soft” approaches have been put

forward by governments such as communication of future public-sector needs instead of local-content requirements (see e.g. the Australian experience in Chap. 3) The EU public-procurement rules have been found difficult to adjust to local business culture in Denmark, which heavily builds on informal interactions (Chap. 6). The influence has also been more direct. Australia opted out from WTO GPA mostly because of industrial concerns, although today the country's public procurement rules closely follow the international practice due to free-trade agreement with the US. Korea prudently chose the time to enter WTO GPA: it did not join before the basic development level was achieved and the Korean companies were able to compete on international markets (Chap. 10). At the same time, ever since Korea joined WTO GPA it has limited its strategic procurement policies (including innovation) with what is allowed by the WTO GPA; that is SMEs and R&D procurement. At the same time all countries that pursue the "no policy" policy in PPI (Estonia, Hong Kong and Greece) are signatories to WTO GPA and closely follow the principles of international trade regulation in their public procurement system.

It can be hypothesized that the international trade regulation has been an influential factor behind the recent policy shift from industry-relevant public procurement towards R&D procurement. On the one hand, this shift has been about bridging the demand-side instruments with supply-side innovation-policy measures, reflecting the general tendencies of national innovation policies to support technology push rather than pull. On the other hand, R&D procurement falls outside the international free trade agreements and thus gives the government an incentive to redirect their policies towards public R&D procurement, which leaves them much more room for maneuver compared to purchasing end-products. At the same time this development deepens the existing bias of innovation policy-making towards high-tech sectors. While these developments can be regarded as potentially beneficial for addressing societal grand challenges (e.g., energy, ageing, environmental pollution) by facilitating radical innovations, the greater reliance upon public R&D (or pre-commercial) procurement actually leaves the majority of public suppliers, and consequently entire economic sectors, outside the PPI policy scope.

There are also some counterarguments to the inhibiting role of the current international public procurement regulation towards PPI. One is that the ideological pressure and belief in government failure in the 1990s was so overwhelming that it became virtually impossible for governments to ignore the neo-liberal recipes for economic development, and therefore it was the international normative pressure rather than the regulatory framework that was behind the declining interest for PPI. The other is that in spite of the changed ideological milieu and regulative framework,

full-blown policy initiatives still took hold in countries with new regulative environment (e.g., US) and sporadic implementation of PPI cases occurred even in countries such as Hong Kong and Estonia, generally reluctant to PPI, meaning that PPI was possible under the new trade regulation.

Third, changes in the international trade regulation have left public procurement one of the few legitimate tools available for the governments to pursue industrial policy. The developments in the international trade regime have made it rather complicated for governments to employ direct industrial policy measures as they did before the 1980s (Soete 2007) or even before WWII (see Reinert 2007, Chang 2002). Public procurement can be still used by governments as an explicit industrial policy tool when organized as pre-commercial (i.e. R&D) procurement or if a country has opted out from the WTO Government Procurement Agreement (which the majority of developing countries still have); also, it can be used implicitly by benefiting from natural restrictions that exist when entering a country's public procurement market (language, court practice, availability of information etc.) (see e.g. Weiss and Thurbon 2006). Thus, if on the one hand the growing role of international trade agreements may have diminished the importance of PPI since the 1980s, then on the other hand, the current renaissance of the PPI policy can perhaps be explained by the fact that it epitomizes a policy potential similar to that of the traditional industrial policy.

A separate question is how effective such a policy is considering that since the 2000s we are seeing the emergence of highly specialized networks that operate and source production and knowledge, often supra-regionally or even globally (e.g., Ernst and Kim 2002, Berger 2006). Such global innovation networks – a globally organized web of complex interactions between firms and non-firm organizations engaged in knowledge production related to and resulting in innovation – calls for additional research on national innovation policy tools.

14.3.2 Socio-economic environment

Studies on economic development show that division of tasks between **state and society** (including the state's role in economic development), political preferences and state structure (including rate of centralization) are among the factors that are relevant. One could assume that countries more similar to the developmental state concept (as defined, e.g., in Chang 2002) or coordinated market economy (Hall and Soskice 2001) are in a better position to design and implement PPI policies than others as the state's role in steering economic processes and, related to that, the use of public procurement for developmental ends is more likely to be an acknowledged and legitimized practice.

The case studies demonstrate that today the utilization of PPI does not follow clearly identifiable state-society relationship patterns. PPI has been widely implemented in some liberal market economies for a long time (e.g., the US), whereas in other liberal market economies PPI has been either absent (Estonia, Hong Kong) or emerged only recently (e.g., Australia, the UK). Sweden, being an example of a coordinated market economy, was a heavy user of PPI well into the 1990s, but today is allegedly lagging behind some other European countries. At the same time Denmark, also a typical corporatist state, has been a rather reluctant user of PPI throughout the last half-century. It is interesting to note that PPI was widely exploited in the East Asian developmental states after WWII (e.g., Korea, but also Japan, see Chap. 2), but to a far lesser extent today (Chap. 9, but also Myoken 2010). China, where the state plays a dominant role in economic development has only recently started to implement extensive PPI policies.

The introduction and continuity of a policy idea often depend on how well it is embedded into politically acceptable (innovation) policy-making patterns, i.e. how well it is coupled with dominant (economic) policy thinking shared by the politico-administrative elite (Block and Keller 2011). The country chapters in the current book show that this is a relevant factor also in PPI policy-making. In the US, the security concerns have made it possible to sustain active PPI policy-making (Chap. 13) and to overcome opposition based on political preferences. Estonian political leadership has been dominated by parties following neo-liberal ideologies for a long time, and the country has never implemented clear policies for PPI (Chap. 7). Hong Kong has followed a similar path (Chap. 9). In Australia, the recent turn towards more explicit PPI policy-making emerged when the social democrats took over the cabinet office from the neo-liberal-oriented party (Chap. 3). In the UK, the current surge for PPI took off under Labour but was revised by the coalition of the conservatives and liberal democrats (Chap. 12).

It follows from the cases that the main (and especially the successful) historical as well as currently implemented policy practices are very often driven and enabled by some country-specific **socio-economic challenges** that act as a legitimizing factor for PPI policy-making. The security concerns in the US and to a somewhat lesser extent Australia (see Chap. 13 and 3 respectively), the development of highly dominant industries such as oil in Brazil (see Chap. 4), environmental issues in the Nordic countries (see Chap. 6 and 9) and challenges to the health sector following the demographic developments in Denmark (Chap. 6) are some examples. These features seem to provide governments with a much needed "anchor" for establishing and developing PPI capabilities and a shelter from a changing and unsupportive socio-economic environment. The lat-

ter can mean, for instance, a radical change in the ideological milieu or regulative framework. However, these anchors (if present) are usually nurtured in specific, often idiosyncratic, institutional contexts, which in turn influence where the public-sector PPI capabilities reside and are maintained and, thus, how the PPI policy evolves. These domestically idiosyncratic “anchors” make it possible for policy stakeholders to overcome inherent problems of PPI (e.g. high technology, financial and political risks) as well as general public procurement (e.g. multiple goals and conflicting institutional settings). The US public technology and R&D procurement policies (Chap. 13) provide an example here. Driven by security concerns in the widest sense, the current PPI policies have become highly institutionalized over a long course of time and facilitated by a variety of factors: long-term capability accumulation through military practices, existence and constant reinforcement of innovation-friendly values (i.e. inherent quest of the public sector for transformative and marketable technologies), special legal treatment for innovative products (Buy American Act, Small Business Act, incl. open-door access for high-tech companies to federal market if financed through SBIR), and continuing presence of dedicated organizations that provides training (e.g., ICAF) or champions new technologies (e.g. SBIR, In-Q-Tel).

It is interesting to note that although national competitiveness is almost always linked to PPI policy initiatives, the competitiveness challenge alone does not lead to significant PPI policy actions. This can be evidenced from Australia, Denmark, Brazil, the UK and Estonia, which all emphasize the potential of PPI, but have not yet been able to introduce significant PPI policy instruments. Similarly, although the financial and economic crisis could be seen as another “anchor” for pursuing more substantial PPI policies, we do not observe this link to be present. In Australia the largest support packages of all OECD nations was introduced and, as economic stimulus became the driver of economic policy, allocations to innovation support, including PPI instruments, increased. Nevertheless, this proved to be of limited effect (Chap. 3). In China, the city of Shanghai offered public contracts to technology-intensive companies to shelter these from crisis, however this was again a limited-scale effort. At the same time, the crisis has put cutback management rather than strategic public procurement at the focus of public consumption in Estonia and Greece. In these countries the crisis strongly reinforced the dominant position of macro-economic stability policies over government intervention.

Today innovation policies are operationalized via the concept of a **national innovation system** (NIS) – the most developed theoretical and policy-making discourse about innovation and concepts closely related to it, like clusters and regional innovation systems. As it is the national innovation

system within which innovation processes take place, policies related to public procurement can have a direct influence.

Countries with advanced innovation systems (Australia, Denmark, Republic of Korea, Sweden, United Kingdom, USA; see Tables 1.2 and 14.2) generally apply a more extensive range of innovation policy instruments and possess stronger innovation policy governance capabilities. Still, innovation policy support is overall limited to supply-side measures, reflecting the general tendencies of national policies to support technology push rather than pull. Although conscious PPI policy-making has not been important in influencing the overall development of innovation systems on the national level, there is evidence that there has been a positive impact on sectoral innovation systems (e.g., security in Australia and USA, oil industry in Brazil, ICT in Estonia).

It is interesting to note that even in those countries with weaker NIS (such as Estonia, Greece, Hong Kong) there is an increasing interest towards PPI. However, market structure and capabilities of companies matter – firms can be differentiated according to their technological competence (Pavitt 1984) – meaning that their ability to respond to PPI policies probably also differs. The country chapters illustrate that the experience with PPI has been related to PPI as technology (industrial) development policy and PPI as R&D policy and thus assumes the existence of technology and/or R&D-intensive private-sector suppliers. Case studies on Estonia (Chap. 7) and Greece (Chap. 8) show that these countries generally lack the main requirements for engaging in technology-centered PPI – a dynamic local production constituting a supply sector willing to push for technological development –, thus calling for further research on this issue.

Related to that, country cases show that the role of industry associations can be important as in some countries they have influenced PPI policy processes (especially in Australia, USA, UK). A similar story lies behind the successful ICT-related procurements in Estonia, where “ethical hackers” pushed the public administration apparatus to procure innovative e-government solutions (Chap. 7). While at the same time a lack of lobbying on the part of industry (i.e. the small number of large companies and the lack of interest from foreign companies due to the small size of the local markets) is generally true for Estonia and Greece (see Chap. 8 for this argument).

Furthermore, asymmetries within government **demand** for innovative products plays another key role in developing PPI policy solutions. As the Brazilian case shows (Chap. 4), if a procurement policy aimed at innovation should emerge, it must take into account the technological asymmetries within government procurement (Chap. 4). This means that dif-

ferent government sectors tend to consume different products in terms of their technological content. As demonstrated also by the example of Estonia, the low-tech sectors tend to be the main government suppliers (Chap. 7). One possible suggestion based on this could be that government should acknowledge the importance of high-tech industry in the overall economic development in a country and re-orientate their procurement policies and practices accordingly. Perhaps a more plausible suggestion, however, could be that government should adapt their PPI policies in a way that would help to upgrade the skills of low-tech sectors. In other words, government – in addition to focusing more on purchasing high-tech solutions – should use more innovation-conducive practices to motivate their main partners, i.e. low-tech sectors, to innovate.

14.3.3 Policy context

Table 14.2 above demonstrates that public procurement is expected to serve innovation goals in very different ways. What is noteworthy, however, is that programs that directly put public procurement at the center of national innovation policies are not that commonplace as one would have expected, based on the emerging international PPI “hype”. Instead, indirectness in PPI policy-making can be observed – in most cases public procurement is used as an indirect or additional innovation incentive that is (often loosely) supplemented to the existing (sectoral) policy instruments (e.g. R&D, energy, SME). Indirectness refers to a situation where a public-procurement contract opportunity as such rather than the procurement process itself is expected to lead to innovation and innovation diffusion. This also means that current PPI policy developments are not always demand-driven, but try to accommodate social needs, supply-side needs and actual public demand. This corresponds to what we have called earlier a “soft public procurement” approach; an approach that embeds procurement-like logic into innovation and industrial policy-making (Kattel and Lember 2010).

When direct PPI policies are implemented, the empirical evidence points to cautious and rather small-scale initiatives and slow progress in transforming policy plans into practice. This is especially evidenced, for example, in Australia, the UK, Brazil and Denmark. Policy statements rather than regulative interventions, voluntary rather than mandatory instruments, sporadic rather than institutionalized support structures tend to prevail in today’s PPI policy-making. A slow uptake of PPI can be observed even in cases where dedicated policy institutions and support structures are developed.

For example, in the UK the strong reliance on contracting-out and third-party involvement in public service delivery has hallmarked public-sector

reforms over the past three decades and put public procurement under a constant pressure to deliver the reform expectations. Today, innovation is widely seen among the UK policy players as a crucial element in re-making the public sector and public services, and this has led to very active formal policy-making in combining outsourcing and public procurement with innovation aims. However, the UK case demonstrates that formal policy-making does not automatically lead to widespread implementation, and the actual practice has lagged behind policy plans. The UK experience implies that in addition to “overcrowding” of the “policy through procurement” agenda, the prevailing quest for typical NPM values such as short-term efficiency gains may actually contradict PPI ideas, and thus contribute to the slow diffusion of PPI policy ideas and practices within the public sector (Chap. 12).

Even countries that have opted out from international public procurement regulative frameworks and have rather substantial developmental policies in operation have not been able to champion PPI. For example, Brazil, which is not a member of WTO GPA and enjoys relatively more policy freedom, has given explicit preference to innovative solutions in its public procurement regulation (overpricing rate up to 25%), but the dominance of regular public-procurement routines, a corruptocentric approach and a lack of personnel with necessary skills inhibit the potential use of PPI (Chap. 4). This somewhat paradoxical situation is well summarized by Thurbon (Chap. 3), who, when analyzing the case of Australia, states that:

In reality these [innovation] obstacles have little to do with Australia’s international trade obligations. The most significant barriers to a more proactive and strategic approach to PPfI in Australia are home grown – and the most entrenched are ‘attitudinal’.

Public procurement is a highly institutionalized field, where persistent structures and routines have evolved during the past three or four decades, which, as indicated by many of the country cases, have proven to be difficult to change in accordance to innovation policy purposes. Short-termism and risk-evasiveness are among the influential **values** that were also underlined in the country chapters. The evidence from the country chapters indicates that the current public procurement institutions fail to reward risk-taking that is needed for effective PPI, whereas quest for non-discrimination and transparency together with cumbersome procurement regulation has made lowest-price bidding the safest way to conduct public procurements. Although countries have introduced specific policy measures to promote PPI and assist public procurers to bear extra risks, most of these policy solutions – as indicated above – are yet to prove their effectiveness in changing the dominant public procurement routines and practices.

The introduction of PPI policies has also been influenced by the nature of modern public procurement systems. Although there are some modest centralization tendencies present in some countries, today almost all countries that want to apply PPI policies have to do it in a context of decentralized public procurement systems. This means that not only are the majority of public procurements carried out independently by various public units, but also the state structures are increasingly detached vertically as well as horizontally from each other. This makes it difficult to introduce change into a public procurement system as one must overcome vast coordination challenges. Also, in such a decentralized system it is more difficult to design robust incentive mechanisms that would accommodate the needs of all different public organizations.

The countries which are often heralded as champions of the most influential users of PPI (such as the US today or post-war Japan) have had explicit institutional structures to support the PPI policy-making. At the same time, the actual PPI policy practice (as opposed to declarative policy rhetoric) that is anchored to context-specific peculiarities hardly lends itself to copy, especially as these structures are not easily at hand for most of the countries planning to introduce PPI policies today. Think only of the security-driven PPI policy-making and related mix of support structures and institutions in the US (see above and also Chap. 13) or public technology-procurement programs in Korea, the implementation of which is facilitated by a highly centralized public procurement system and a central public procurement unit that is a sub-unit to the ministry responsible for economic development (Chap. 10).

14.4 Conclusions

Innovation-oriented public procurement has a long history. The respective policies, and the way public procurement has actually been used to foster innovation, have, however, changed considerably over the past four decades. While during the industrial policy era up until the 1980s public procurement was mostly used to induce new technologies and entire industries via direct public technology-procurement programs as well as R&D procurement, the emerging policy consensus emphasizes more holistic ideas and sees public procurement as a more generic tool in promoting innovation.

The current book maps the latest PPI policy developments in various contexts and analyzes the evolution and development of the various policy solutions in wider institutional contexts. Through the cases of 11 countries with highly diverse economic and social settings, the book points to the existence of a much more nuanced PPI policy landscape than that has been acknowledged in the academic and policy debates so far.

First, there is no single PPI policy approach that governments follow. Instead, innovation is targeted through a mix of various mechanisms. We classified the existing policy patterns as follows: PPI as technology (industrial) development policy, PPI as R&D policy, PPI as generic policy (so-called “policy for all seasons”), and PPI as “no policy” policy. Each of these approaches has its own underlying logic and is shaped by different institutional constraints. What is, however, important is not the classification as such, but the fact that depending on a specific policy instrument, PPI policy-making assumes rather different policy capacities and institutional fit.

Second, in spite of a strong supportive rhetoric worldwide, the actual PPI policy measures implemented are still cautious rather than substantial. With some notable exceptions aside, the countries are still struggling in designing and implementing PPI policies that would be capable of bringing about major innovation effects.

Third, indirectness rather than directness characterizes the currently prevailing PPI policy solutions. This means that the most ambitious policies implemented do not actually use the process of public procurement as an innovation driver, but instead use the opportunity of obtaining public procurement contracts as an additional innovation incentive among other policy instruments. Thus, somewhat paradoxically, public procurers tend to play a secondary role in today’s PPI policy developments.

Fourth, most of the introduced PPI policy measures are in fact systemic in their nature rather than pure PPI policy instruments and combine various supply- and demand-side approaches. Many of the current PPI policies tend to suffer from supply-sidedness, where newly introduced measures are built upon the existing supply support structures.

Fifth, sectoral and public organizations’ intrinsic rationale, e.g. need for green technologies or new health solutions, rather than innovation policy rationale tends to be the main driver in most countries’ PPI activities. This means that today PPI-policy incentive structures are still mostly outside the reach and influence of public procurement as well as innovation policy domains.

These general conclusions should be a source for further activities for both policy-makers and the academic community. We believe that for policy-makers the wealth of experience described in the book should not only be a good source for benchmarking, but it also provides many useful ideas for further policy experimentation. Next to concrete policy instruments (see Table 14.2), the empirical evidence suggests, for example, more targeted PPI-relevant training, institutionalized pre-tender dialogue proce-

dures with industries, explicit legal incentives, coordinated signaling of future needs, more structured information and best-practice sharing, more targeted involvement of low-tech sectors, and dedicated funding schemes.

These suggestions are hardly novel, but what the book demonstrates is that the application of these and other concrete measures may fail to produce the expected results if the wider institutional constraints are ignored. For example, full-blown PPI policy measures addressing the entire public sector may not be the best strategy to start with, as public procurement has over time become a highly institutionalized process that is not only hardly ever driven by innovation motives, but that has proven to be difficult to change. Moreover, public procurement systems tend to be highly decentralized, which assumes a strong coordination capacity from PPI policy-makers. If this fact is ignored, the suggested policy tools can provide only a limited effect. As pointed out by many contributors to the book, more selective and sector-based initiatives that stem from intrinsic policy or organizational rather than innovation-policy needs have served as a useful starting point for PPI. In these cases it is easier to develop the needed policy as well as administrative capacity for conducting innovation-supportive public procurements, as the motivation for taking the extra risk comes from within the responsible organization. Fields with a proven track-record in PPI could be another starting point for building up the needed policy capabilities.

We identify major normative pressures – shift in economic, administrative and innovation policy-thinking as well as in the international trade regime – that have had a strong influence on the PPI policy initiatives. This mix of pressures has proven to be a fertile ground for the accumulation of public procurement routines and culture that constrain the potential of public procurement in spurring innovation. In this context, as demonstrated by many country cases, the capacity to resist normative pressures and capacity to find room for maneuver within international trade regulation is needed in order to pursue long-term and successful PPI policies.

However, as we also noted, country experiences within the general converging trend tend to be still relatively diverse. It is our understanding that the socio-economic context and especially the changes in it play an important role in shaping the actual PPI practices. This refers to differences in the embeddedness of state and society, socio-economic challenges faced and the overall status of a national innovation system. Here the legitimization of the PPI idea in the local socio-economic context becomes crucial. The legitimization of a PPI policy may be facilitated if it was anchored to widely accepted national or regional challenges (e.g. security, energy, health). But this challenge must be a real challenge

where the connection between national need and the role of PPI can be easily perceived. For example, national competitiveness concerns seem not to be the kind of a challenge where the link can be automatically made. It might take much more than abstract challenges to pave the way for substantial and sustainable PPI policy-making.

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