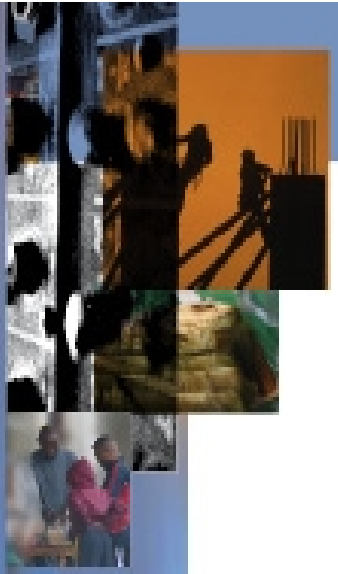
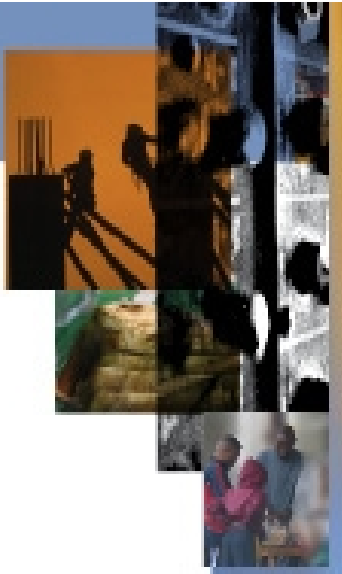

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The Regulatory Environment and its Impact on the Nature and Level of Economic Growth and Development in South Africa

Skills Training and its Discontents in South Africa

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Introduction

No constituency is satisfied with our existing skills training arrangements. Periodically we see critical statements by the business community, trade unions, politicians and certain branches of government – but not Labour - asserting that the set of new institutions and policies going under the heading of the National Skills Development Programme is inefficient or inequitable or indeed disfunctional. These features of the system are *new* in the sense that they came into being less than ten years ago, but modifications may be necessary. This paper suggests where investigation is required before policy change is indicated.

An alternative title to this paper could be 'Are there design flaws in the system to train human capital in South Africa?' No answer is possible at this moment, but it makes sense to identify the features of our system that warrant wider and more intensive investigation on the way to an answer. That is what is tackled in this paper. As will be apparent, the needed research task is too large for a single private researcher, and the information required is often not available to such a research worker. For example, a selective and representative sample of Setas would have to be consulted, including their member companies. But in most cases such information is regarded as confidential by the Setas concerned. So the research task is for a government department or agency to initiate and finance.

The economics of skills training is straightforward in theory. Given the textbook set of assumptions about the working of occupational labour markets, formally stated, both employer and worker will invest in training up to level where the present value of the marginal benefits *equals* the marginal costs of further investment in skill acquisition. But where there is inequality between the marginal values of these variables – through market imperfections or failures – then suboptimal amounts of investment will take place. Either the worker or the employer or both will be frustrated from maximising their own well-being. This is what we teach second year economics students.

What can usefully be said about this theoretical framework is that it provides a conceptual base line that points to phenomena to be investigated empirically in actual labour markets. (i) Will firms or other employing organisations in government or the non-profit sector be reluctant to invest resources in training workers if, once skilled, they are free to move to other employers to realize the higher earnings in line with their higher productivity? (ii) The acquisition of *general* or portable skills has to be financed by the individual in training, either paying costs directly or through reduced cash wages and fringe benefits. (iii) The cost of investment in *firm-specific* skills will be shared to the extent that the resulting productivity gains are divided between higher wages for skilled workers and higher organisational profits.

The logic of this 'make or buy' decision problem in acquiring skills, facing the worker and the employer, is impeccable within the prototype competitive market model. But the really difficult questions are the extent to which any concrete situation departs from this model and the prediction of the consequences that follow. For example, how suboptimal are the actual levels of training provision, how serious in practice is the inhibition of skill-using activities in sectors and the economy at large, and what is the loss of potential earnings and profits that results? The next step is to ask what kind of governmental intervention is indicated, noting that costs and benefits estimation must be attempted so as to inform this decision about *regulation* in the broad sense in which that term is

interpreted in this conference. It cannot be simply assumed that net gains will follow from intervention.

There are major issues of method or procedure at stake here which, given the policy-orientation of this paper, we discuss no further. Instead we focus on a limited set of questions prompted by the international literature. These are grounded on research not yet attempted in South Africa, so the intention is to sketch an agenda for further investigation of our occupational labour markets and our set of institutions brought into being by the NSDS in the past decade.

Information issues in the regulation of skills training

In South Africa we barely have a choice of measurement data on skills. It is either *occupations* from the Labour Force Survey or it is *education levels* or *years of education* completed from various census takings. There are also hybrids like *occupational levels* containing skill slots labelled 'top management, middle management, skilled, semi-skilled' and so on (for example, in the proposed legislation for Employment Equity). But none of these identify skills with the precision that can supply answers to a range of questions important to employers, organised labour and policy-makers. The following instances illustrate what these constituencies want to know for their varying purposes.

- How well do skills measured by occupation or education approximate to the level of skill used in the work-place?
- Do such measures provide usable information about worker task discretion, that is, about the extent to which the performer of work exercises judgement and competence?
- Have the skill requirements of jobs by sector and economy-wide been rising in recent decades?
- Skill-biased technological change *(sbtc)* appears to be a universal phenomenon, but in which sectors in the South African economy is the evidenced trend most marked?
- The international norm is for the bulk of training to be initiated and financed by firms, two-thirds or more as measured in a given time period. But then such opportunities are not available to unemployed workers, so a skills policy can clearly not be an 'inclusive policy option' with both efficiency and equity goals.
- Have new kinds of competence like *influence skills* – communicating, analysing and persuading – emerged into view as categories that require separate recognition and measurement? (Machin 2008; Felstead & Others 2007; Davis & Kewin 2007; Bassanini & Others 2005; Wolf 2002)

Table 1 illustrates the range of alternative measures of skills available in a large industrial country labour market. Collection costs can be high. The UK Skills Survey 2006 involved almost 5000 interviews with workers in their home environments. Even scaled down for a smaller statistical population if conducted in South Africa this would be a costly item for a state research budget. But this is a surmise more than an informed verdict.

Skill shortages, skill gaps and the accuracy of existing estimates

Demand for skilled labour is a derived demand. The process of economic change drives demand alterations in the labour market and consequently skill needs. The altering industrial structure is itself the result of changes in the patterns of consumer demand, technology and organisational evolution, "as well as the evolving pattern of national competitive advantage [that] continues to change the balance of occupations, qualifications and skills required in the labour market." (Campbell & Others 2001: 210) These causal mechanisms, difficult to model, are a compelling reason for not placing a high degree of confidence in projections of skill shortages in any economic sector.

Strictly speaking, a fully-specified macroeconomic model is required to make projections of future skilled labour demand. Projections in industrial countries like the UK do exist but not in South Africa. In the absence of such a model, establishing the *expected* performance in skills training in any sector will be only an approximation. More seriously it will be an approximation of unknown reliability. For instance, how do skills planners factor into their numerical projections the determinants of demand generated by future rates of productivity growth in the economy's component industries, the changing demand for their output, and their international trade performance? These are discussed below.

A modest claim is the most supportable, like the following for UK skills projections even when use is made of a macroeconomic model.

> The results presented here should be regarded as indicative of general trends and orders of magnitude rather than precise forecasts of what will necessarily happen. That is, they are *not intended to be prescriptive* but rather to indicate the most likely future given a continuation of past patterns of behaviour and performance… If policies and patterns of behaviour are changed then alternative futures might be realised. The results are intended to provide *a useful benchmark for debate and policy deliberations* about underlying employment trends. (Sector Skills Development Agency, UK 2006: 3, italics added.)

This section of the paper spells out the reasons why claims of skills shortages in South Africa's occupational labour markets must be approached with caution. There are no research results directed at testing local estimates of shortage. Yet the international literature provides reasons to inject uncertainty into all discussions about skills deficiencies. Such scepticism should strengthen more than weaken policy concerns.

Tables 2 to 4 illustrate the types of skills and the *perceptions* about them that are in question, from a UK study devoted to exposing the ambiguities of existing estimates of skill deficiencies in regional, sectoral as well as national labour markets (Watson, Johnson and Webb 2006). Its results and the conclusions drawn are salutary for South African research on shortages. Three observations sketch the problem.

[1] The concept of a *shortage* can be ambiguous without the individuals questioned about it being aware. UK evidence shows that some respondents – in one study 60 % of employers, companies, recruitment agencies – take the question about shortage numbers to refer to *external recruitment* difficulties they have experienced in the relevant occupational labour market. The remainder of employers (about 45% because some thought it referred as well to their existing workers and thus the two choices overlapped), as reported in the Confederation of British Industry survey data, assumed the question

concerned the skill deficiencies evident in their *existing workforces*. (Forth & Mason 2004; Richardson 2007; Richardson & Tan 2007) But these are wholly different concepts of deficiency.

[2] An additional but separate problem is that "when employers talk about skill, they are often referring to a range of desired behavioural attributes (reliability, adaptability, ability to work without supervision) as well as the technical abilities that are more conventionally considered to be 'skills'". (Watson & Others 2006: 40)

Because of the inconsistencies which have crept into the operational definitions used in certain national surveys of skill quantities in excess demand, recent suggestions have been to *avoid* use of the word "shortage" completely.

> Given the definitional ambiguity regarding skills shortages we construct four definitions from the data base:
> - *Current skills gap*: those respondents reporting that there exist 'gaps between the skills currently available within your workforce and the skills which your organization needs to achieve its business objectives'.
> - *Hard to fill vacancy (HTFV)*: those respondents that have 'experienced any difficulty in recruiting the staff you need' during the 12 months prior to the survey.
> - *Anticipated skill problem*: those answering 'yes' to the question 'could you say whether you anticipate that skills shortages in the next 3 to 5 years will affect your company'.
> - *Emerging skill problem*: employers that do not feel that they have a current skill gap, but anticipate that skill problems of some kind will emerge in the future." (Watson & Others 2006: 44)

If we apply these distinctions to the South African statements of skill shortages by occupation in specific sectors, like the estimates quoted by companies, professional associations and the 23 Setas, we do not know with sufficient clarity the following characteristics. (i) Which concepts of skills deficiency underlie them; (ii) in what numbers; and (iii) whether the explicit or implicit definitions being used are uniform between the sources consulted, as well as over time.

It takes no extended argument to show that the estimated shortages now circulating in the South African policy arena have ambiguous implications for skill formation planning by companies. The ambiguity probably extends to industry-level bodies as well as to Setas and the state agencies charged with fostering skills training. Whether we can diminish this uncertainty in the future remains to be seen. But we have to recognise it first.

What we do with the existing numbers claimed to be shortages is not yet clear. We need to assess their accuracy by paying attention explicitly to the way they were gathered. But this task has to remain pending until the cluster of definitional uncertainties are tested. The present paper encourages that testing.

[3] Another potentially serious problem for skill shortage estimates is the existence of *influence activities* within companies, corporations, state departments and other employing organisations. The capacity to influence information and decisions comes into

play when respondents provide estimates of the input shortages they state their organisations to be facing.

> Influence activities arise in organizations when organizational decisions affect the distribution of wealth or other benefits among members or constituent groups of the organization and, in pursuit of their selfish interests, the affected individuals or groups attempt to influence the decision to their benefit. The cost of these influence activities are *influence costs*. The fundamental difficulty with the [any] policy of selective intervention is that it requires that there be a decision maker with the *power* to intervene who *collects information* with which to make decisions. (Milgrom & Roberts 1992: 192-3, original italics).

When this suggestion is raised about skill shortage estimates in other countries there are claims backed by evidence that, when surveyed, personnel departments in large companies have a motive to exaggerate skill deficiencies. This is true under specified conditions. Conversely, if information of the same kind is obtained from non-personnel company officials – like senior line or production managers - the shortages figures supplied tend to be lower.

Examples of other distorting influences, based on UK research by Bosworth (1993), are the following.

"Empirical tests involving multivariate analysis of establishment data from the 1990 Skill Needs in Britain Survey demonstrate that the probability of an establishment reporting a skills shortage depends on a range of factors. This includes: the size of the establishment; whether it is based on a single site; its sector; the occupational structure of employment; and the nature of the local labour market." (Watson & Others 2006: 41)

The literature on the question of reliability in skill shortage estimates is growing in those countries where there are campaigns to raise the national rate of training, as in South Africa. It is not the present intention to provide a survey, but the following questions are relevant to consider in the local discussion of shortages, to which this presentation is a contribution.

First, are there systematic *differences* in perceptions of shortage between employers and employees, as well as between the different layers of responsibility within a single organisation?

Second, do similar perception differences exist between trainees, apprentices and students who place emphasis on "specific job-related knowledge", whereas management and supervisors lay stress also on the importance of "soft skills" like inter-personal abilities and punctuality?

Third, do differences in the asserted importance of skills by type show up between those experienced in the work place and those lacking experience? The latter are labour market respondents, either completing formal education at one or other level, or emerging from unemployment spells before finding their first job. It appears that experience itself can influence worker and manager perceptions of skill requirements in production.

Finally, an illustration of the importance of these distinctions, as well as the steps essential to establish skill shortages with a reasonable degree of accuracy, is provided by the following illustration from a Scottish study.

Recall that vacancies can be hard-to-fill for three main reasons. *Only* the third reason C is a skill shortage.

A. A lack of applicants (perhaps a reflection of the nature of the job on offer).
B. Employer judgements on applicants' attitude, motivation and personality.
C. Applicants lack the required qualifications, experience and the competencies that accord with preconceived notions of production requirements.

> Assessing the scale of hard-to-fill and skill shortage vacancies consisted of *four stages* [in the Scottish example].
> 1. Establishments identified the number of vacancies they currently had.
> 2. Establishments then said how many of those were 'hard-to-fill'.
> 3. Next, the reason why the vacancies were hard-to-fill was sought – was it because of the quality of applicants or was it because there were few applicants for the post?
> 4. Where vacancies were hard-to-fill due to the quality of applicants, establishments were asked precisely what qualities were lacking.
> - Skills shortages vacancies only occur where employers judge applicants to lack the required skills, qualifications or experience.
> - Where the attitude, personality or motivation of applicants was called into question by employers, these are *not skills shortage vacancies*. (Future Skills Scotland 2006: 6, 15, italics added).

Whether any South African estimates of skill shortages follow this elaborated multi-stage procedure is not known, but none of the local sources consulted in the last three years evidenced this practice. This is an insufficient basis for an outright judgement about the questionable accuracy of existing estimates. But these international studies justify the re-consideration and re-design of future measurements of shortages. The quoted passages below indicate the direction new South African research should be taking.

> These findings suggest that while employers appear not to have any problem for themselves in interpreting questions on "skill shortages" (if only because they showed no reluctance to answer the question) *we cannot rely on them* being perceived in a uniform and consistent way by all employers…Our findings point to two main conclusions for future research. First, studies that investigate the causes and effects of "skill shortages" need to pay serious attention to their *measurement*. If one is not certain of what is being measured, one can hardly be absolutely confident in the findings. Another practical conclusion is that in future research on establishments and their skill formation practices, further steps could be taken to gain *clarification* either directly or indirectly from respondents as to the experiences they choose to classify as a skills shortage. (Green, Machin & Wilkinson 1998: 183, italics added; Green & Owen 2003; Skinner, Saunders & Beresford 2004.)

> Overall we failed to reject the proposal that personnel departments within large firms send mixed signals regarding skill deficiencies. One implication of our

> results is that past research on the extent of skill deficiencies within the UK economy may have been *overemphasized* due to the failure to control for the bias present in questionnaire responses. Therefore, we would recommend that any future studies using questionnaires to analyse the extent of skill deficiencies should *control* for the position of the respondent within the company. In this way future results will provide a more accurate picture of the skills problems facing the UK. In addition, the results have an important implication for large companies. Such companies may want to investigate the reporting of skill deficiencies within their own organization in order to discover whether influence costs are prevalent. This would enable companies to provide a *more accurate signal* as to the extent of skill problems and reduce overall costs. (Watson & Others 2006: 55-6, italics added.)
>
> In the market for engineer-scientists or for any other commodity we expect that a steady upward shift in the demand curve over a period of time will produce a shortage, that is, a situation in which there are unfilled vacancies in positions where salaries are the same as those being currently paid in others of the same type and quality. Such a shortage we will term a *dynamic shortage*. The magnitude of the dynamic shortage depends upon the rate of increase in demand, the reaction speed in the market, and the elasticity of supply and demand. (Arrow & Capron 1959: 301)

It is ironic that this last statement by Arrow & Capron is fifty years old. It states clearly the requirement, already stated in the introduction to this paper, that it makes little sense to speak about the shortage of any commodity without explicit reference to its price. We cannot identify quantities of skills or occupations as being in excess demand – for instance, a shortage of some specific skill like a qualified chartered accountant – nor can we analyse the possible reasons for such a shortage without linking that shortage to its price. The concept has to be of a shortage *at a stated level of the wage or salary package being paid currently for a skill of the same type, quality and experience*.

Yet this is exactly what skill shortage estimates overlook in the South African discussion about skills training. We do not know *whether* the employer stating a shortage is willing to pay the going salary, or is willing to pay more to obtain a suitably qualified appointee, if supply channels are responsive to higher offers. Equally important, we do not know *why* the supply mechanism – the training of such skilled workers – is not responding to the outstanding demand that is identified. This should be a central concern of policy-makers, professional associations and Setas. Yet nobody is able to address it with the incomplete information at hand. Research dedicated to the purpose has to be mounted.

Forecasting skills demand

From the date of its launch ten years ago the National Skills Development Strategy has aimed at the construction of skills plans at workplace, sector and national levels. Subsequently skills planning at the national level appears to have shifted down the policy agenda for reasons that remain unclear. No national plan exists but enterprise and sector planning are routine.

Skills forecasting is subject to unknown margins of error and is no longer practiced in most countries. In general, the international literature is skeptical after the disappointed hopes for developing country man-power planning exercises conducted in the 1970s and earlier (ILO 1995; Heijke 1994; Hopkins 2002; Ellis 2003; Woolard, Kneebone & Lee 2003). By contrast the designers of South Africa's NSDS appeared convinced in the mid-1990s that the jury was still out on the matter. They made projections of skill needs a cornerstone of the new levy-grant system.

The potential pitfalls can be summarized under headings like *'The 3-Ts'*. These are the presumption of fixity in (i) *tastes* or preferences of consumer and investor decision-takers; (ii) production *technology*; and (iii) content patterns of *trade* and investment between countries. For any skills plan to convey useful information these dimensions must be presumed to remain *sufficiently static* over the length of the desired forecast periods. Only then would future skills profiles of acceptable accuracy be obtainable. But from the start these assumptions are questionable on a variety of grounds.

Forecasting difficulties appear to exist in all national labour markets.

> As long ago as 1989 the main [UK] national employers body – the Confederation of British Industry (CBI) – argued that "few employers are able to predict their medium term skill requirements with any confidence. The uncertainties over technology, exchange rates, and future corporate strategies are simply too great to allow traditional corporate manpower planning approaches to work effectively". Many of these factors have with the passage of time become more, not less, uncertain (Gleeson & Keep 2004: 56).

The subject of forecasting is large, so these broad observations suffice to show the underlying uncertainties. For instance, freeing up international capital flows and the increasing globalization of trade in recent decades have significantly *widened* the range of goods and services bought and sold in the majority of domestic commodity markets. It is a likely consequence that changes in tastes have accelerated with accompanying alterations in the mix and availability of consumption and investment goods; although the causes of such changes are not easy to identify. (Acemoglu 2002; Crafts 2004; Rodrik 2004) Similarly, sites of production that can be located internationally are subject to a wider range of location choice. So the number and composition of productive skills in demand in a national economy has to alter in step with such compositional changes driven by trade, as well as by direct investment in productive capacity that more easily crosses national boundaries. Whether these trends make the current forecast of skill requirements subject to even wider error margins than in the past is a hypothesis that must be examined empirically. But we do not pursue the international literature here.

The second obstacle to effective forecasting is the relationship between technological change and the human capital inputs associated with such change. This linkage is complex and not amenable to wide generalization. The key unknowns are the

substitution possibilities *within* any given technique of production in use. Substitution is governed by the flexibility or, at the alternative end of the spectrum, by the fixity of input coefficients per unit of output. This means how much skilled labour, unskilled labour, capital, energy and other identified inputs is required for each unit of production.

This must be interpreted in relative terms, because input-output ratios exist along a spectrum as choices in production. For instance, from low to medium to high capital intensity can characterize the technique of production in use in a firm or industry. At one extreme, complete fixity of input ratios is an assumption of the Leontief-type production function used in the input-output analysis of a given structure of production. Yet there is no agreement on the extent to which such *assumed* fixity is mainly of analytical convenience although subject to unknown accuracy in actual production.

Fixed input coefficients as in this case – say a fixed quantity of capital or skilled labour per unit of output – is a useful assumption for certain estimation purposes. But that is all we can say when the question arises of forecasting the demand for specified skills in a sector or entire economy.

One large American study some years ago was emphatic about the major unknowns that attach to the characteristics of technology and the implications for the determination of skills demand. Applied to the armed forces and still widely cited, it exemplifies the skeptical position on skills forecasting that has emerged in recent decades.

> The conclusions of this research [on the effects of technological change on employment, skill needs and the distribution of earnings] are subject to such enormous uncertainties that policy-makers concerned with training and education are well advised to avoid large resource commitments to any specific vision of the detailed occupational structure and skill requirements of the future US economy…[One illustration is] a study by Binkin of the US military's experience in forecasting and adapting to the changing skill requirements of new weapons systems…[which] shows that the military authorities have been remarkably unsuccessful. Even within an environment in which the design and introduction of new technological systems and the training of personnel to operate these systems are largely controlled by a *single organization* [the armed forces], the skill impacts of new technologies have created severe difficulties for policymakers. (Cyert & Mowery 1988: xviii-xxix.)

International trade is a separate source of uncertainty about future skills demand that provides a simple case against fine-tuned skills projections. South Africa's recent trade history has been marked by fits-and-starts negotiations with its trading partners and by bi-lateral concessions by sector between a range of such partners. In addition there has been the world-wide move towards liberalization of economic transactions across frontiers in the past decade, known as globalisation. So the uncertainty injected into skills projections has arguably become greater in recent decades.

Further, foreign trade is a dimension of policy-making that by its nature is political as well as economic. Thus it is difficult to conceive a reliable forecasting procedure taking into account *both* changing comparative advantages on economic grounds in foreign trade patterns *and* shifts in goals and alliances with other countries driven by political considerations. In addition, research and discussion in the South African economy about

industrial and trade strategy is an ongoing process. In principle, such strategic decisions can be inputs into skills forecasting, but there is no evidence of this taking place in government departments, in SETAs and indeed in the NSDS as a whole (Edwards 2003). The complexity of doing so is likely to be at least one reason.

An additional complication, independent of technology and trade influences, is the preliminary evidence that skilled as well as graduate unemployment has risen in South Africa in recent years. (Pauw, Oosthuizen & van der Westhuizen 2006, Pauw & Others 2006; DPRU 2007) If true, how is this trend to be reconciled with claims of intermediate and high level skills shortages amongst the economically active population? The present paper advances no specific answer because no research has addressed this question directly. But if significant unemployment at these upper levels has emerged then it supports a major contention in this paper about the strategic need for more micro-level research.

At such a level where a worker's skills are matched with the requirements of a job, specific information is required on both sides of a hiring contract. A worker possesses a conventionally described skill, has the documentation to support that competence, and yet is judged unsuitable by a potential employer. Quality deficiencies, including personality characteristics, are the simplest explanation. This is not an unusual circumstance by any means in occupational labour markets, particularly at higher skill levels. It explains why information about *occupations* is often of such limited use in identifying true labour market supply and demand conditions. (Blaug 1995; Spenner 1995; Felstead & Others 2007)

Another consideration relevant to projecting future skill demand is that much technological change in recent decades, particularly the information technology or 'computer' revolution, has *not* been skill neutral. Rather it has pushed up the productivity of high-skilled more than it has that of low-skilled workers, relatively speaking. (Feldstein 2003) This is well known and accepted as a trend that is more or less universal. (Machin 2008) "To provide some examples, computer engineers and programmers have been designing hardware and software that have displaced lower-skilled workers, whether through robots replacing assembly-line factory workers, electronic scanners replacing check-out clerks at retail establishments, or voicemail replacing answering clerks" (Chiswick 2005 :2).

Whether this skill bias is temporary, meaning a transitory advantage to those with higher skills because they adapt more readily, or whether it is inherent in the technology process and will persist remains unclear. But the answer is vital. It will determine whether the widened payment differential between skill levels is permanent or will decline as the technology becomes familiar and is adopted by the wider population. This is unresolved and thus the effect on skills demand by the changing relative prices of skilled and unskilled labour remains difficult to project.

But for the present concern, the forecasting of skill needs is made more difficult by the necessity to track the skills bias while doing so. That this trend exists is no longer in dispute. "[It] seems reasonable to conclude that the [international] evidence shows the wage distribution has been characterised by long-run growth in the relative demand for skills driven by technological change (rather than trade) and that changes in skill supply and institutional changes have affected the timing of how *sbtc* [skill-biased technological change] impacts on the wage structure in different contexts." (Machin 2008: 22)

In essence what has to be devised for usable projections of skill demands is a system of *translation* between knowledge of skills needs at an establishment or plant level and a functioning training system. When aggregated such a translation process could also operate at the industry level. Approaches 5 and 6, *Self-Assessment and Job Requirements*, in Table 1 approximate to such a procedure.

But, as with all policies ambitious in their reach, does the average government have the capacity to run training systems that have to remain continuously responsive to changing production conditions? Public sector administrators of such systems of information about skills are outside observers who would have to know with acceptable accuracy the real short-term skills needs of the business community, as well as of government departments, parastatals and non-profit organisations. In fact, to identify labour market needs is to track a moving target with a proportion of skill shortages entirely transitory, opening up and disappearing within the space of months.
So it remains an open question, best treated without preconception, whether any interest group – employers collectively, the state, or even organised workers – can make human capital projections forward in time that function as a spur to investment decisions in skills training. This question summarises the main concern of this section of the paper.

It may be best to concentrate on the competencies of economically active individuals classified in broad groups (by educational qualifications, certificated skills, work experience, age, gender, language proficiency) because these competencies determine the likelihood of labour market success. This would relegate to secondary importance for skill identification the more specific information about occupation, sector and job description that forecasting exercises presume to be necessary. (Culpepper 2001; Blondal & Others 2002; Greenhalgh 2002; Bassanini & Ok 2004; Bassanini & Others 2005; Forth & Mason 2004.)

Numerous researchers in the field reject explicitly the main presumptions that underlie skills forecasting. Concerning the relationship between education and the skill needs of the economy, counter-assertions like the following are claimed to apply to the majority of economically significant competencies judged necessary by producers. Whether such negative judgements are exaggerated remains to be seen.

> [T]here is no real sense in which a given level of education in the economically active population in a country can be said to be technically “required” to permit the achieved level of economic growth of that country. Such an argument grossly exaggerates the contribution of manipulative and cognitive skills in the performance of economic functions, ignores the fact that such skills are largely acquired by on-the-job training, and utterly neglects the vital role of suitable personality traits in securing the “invisible handshake” on which production critically depends. In short, educational policies may be fitted to literally any level or rate of economic growth and cannot be justified in terms of those patterns of growth. Education does make a contribution to economic growth, not as an indispensable input into the growth process, but simply as a framework which necessarily accommodates the growth process. (Blaug 1995: 51)

One illuminating example of local skills demand forecasting is Woolard, Kneebone & Lee (2003). This study made the following assumptions about the “macro-environment” of the South African economy.

- "The rand is not expected to strengthen in the medium term, implying the continuation of a highly competitive currency and stronger exports (aided by tariff reductions).
- Improved government and domestic savings rates are expected.
- Low inflation (around 6 per cent), coupled with lower and stable interest rates, is expected.
- Continued job losses are expected to occur in the formal sector." (463)

The two assumptions in this set born out as reasonably accurate by subsequent events over the past four years, assuming the forecasting work was conducted in 2001-2, are the two that relate to inflation and job losses in the economy as a whole. Based on these assumptions Tables 5 and 6 below show the anticipated demand for "high-skills" as well as the magnitude of new and replacement demand over the period, 2001-2006, for ten broad categories of occupation.

Five years later we do not have independent evidence about the growth in demand for these skilled workers with which to test these forecasts satisfactorily. Neither does the forecast model lend itself to simple evaluation of its predicted outcomes based on the derived output-employment elasticities that are used. But the inaccuracy of the remaining two assumptions (about the exchange rates and aggregate savings) interpreted as trends should independently make for caution about the skill projections in the tables said to track incremental demand.

Also to be useful to skills investment decision-takers, we will need to presume without question that *occupation* coincides with *skill* as perceived by employers, skilled workers and potential trainees. Overall, although sophisticated this forecasting exercise cannot be judged decisively one way or another.

There are at least two types of changes, quite different, which contribute to alteration in the demand for skilled labour: "(a) changes in the composition of jobs in the economy, and (b) changes in the skill requirements of individual occupations" (Rumberger 1995: 219). Successful forecasting has to take explicit account of trends in *both* of these components of demand. There is no evidence in the wider literature on skills projections that these have been tackled satisfactorily in a realistic model by research-workers and policy makers in other countries.

A recent Australian study of skills forecasting is relevant to our South African attempts – spurred by presumptions in the NSDS - to project the growth in demand that aims at a level of precision that makes it usable in greater matching between the demand and supply of identified skills.

> How should the VET sector decide what to teach in the light of the virtual impossibility of reliable projections of the demand for skills, at the necessary level of detail?
>
> We counsel against trying to project the number of new VET graduates who will be required, by level and type of skill and by location, and then using this to determine the shape of skills training. We do so for two reasons. One is the obvious point: that it cannot be done with any accuracy at the level of detail that is needed for deciding just what to teach and where. The other is a more

> comprehensive point. The labour market is a dynamic entity. *People* are constantly changing their jobs, learning new skills from their work, moving to new locations, moving in and out of the labour force and changing the number of hours per week that they work. At the same time, *firms* are being born, growing, dying, declining, altering the size and skill set of their workforce, recruiting strategic new skills, training some of their existing staff with the incremental skills they find they need. In all of this, formal vocational education has an important, but modest role to play. It is a *misunderstanding* of how the labour market adjusts to believe that there is a direct, one-to-one relation between an expansion in output, the associated increase in skills needed to produce that extra output, and a requirement for the VET system to provide those extra skills. (Richardson & Tan 2007: 33, italics added.)

In summary, this paper's contentions on forecasting, are the following.

- First, projecting investments in the training of newly skilled workers in sectoral and national occupational markets in an economy is subject to unknown but probably significant margins of error that rise with extension of the future horizon.
- Second, it is difficult to acquire evidence in the context of the National Skills Development Strategy about what use member firms make of the sector-wide skills plans constructed by the relevant Seta to inform and facilitate investment planning for skills training. The probable answer is that some firms do and some do not. This question remains open and is self-evidently important.
- Third, constructing an SSP requires considerable effort and resource input from a SETA, so much so that in the past this periodic commitment to the training authorities was carried out for a proportion of SETAs by sub-contracted and specialist agents. A benefit-cost appraisal of SSPs would be a useful input into policy formation.
- Fourth, a number of international studies have pointed out the distorting tendency to use figures of the most strongly growing job kinds as indicators of job growth in an industry or economy as a whole (Rumberger 1995). This can exaggerate the changes in training requirements, especially where the fastest growing jobs require higher than average achievements in formal education in addition to incremental training.
- Finally, there is the temptation to concentrate inordinate forecasting attention on the potential growth in demand for filling new kinds of jobs to the neglect of replacement demand. Putting replacement workers into job slots vacated by retiring and quitting skilled workers can be a considerably larger component of total demand for a skill than are new job slots.

A strong recommendation of this paper is that a thorough cost-benefit investigation be conducted into the periodic production of SSPs. This should devote close attention to the role they may or may not play in facilitating higher levels of net skill production in the sectors to which they apply. Do they fulfill the purpose of skill projections stated in the NSDS design documentation, which is to *raise* the average level of workforce skills in the entire economy?

Figure 1 illustrates both the logic and the set of specific assumptions deemed necessary for skills projections in the UK. These requirements are not simple at all and need recognition in the South African discussions of forecasting. One final cautionary observation should be noted.

> Education and training as policy vehicles are limited in many ways – for example, in the lag between schooling and greater productivity, the *loose linkage* between skills of workers and skill demands of jobs, and the uneven and uncertain responses of managers and firms to uncertainty. Arguments for increased education hinge primarily on bringing all of the population to minimal levels of literacy and additional schooling for the less well-educated because education and training appear to minimize the adverse consequences of technological change for workers, and workers with such training and education adapt to change better and quicker…*Curriculum planning in the face of uncertainty should rely on curriculum diversification and periodic review aimed at adjusting available programs to demand.* Thus, within modest limits, the research on technological change and skill requirements informs education and training policy, and within modest limits, education and training can be expected to inform and solve human problems associated with technological change. (Spenner 1995: 128-9, italics added.)

Items for a future research agenda

The following suggested research questions are listed briefly and in serial form given the space limitation of a conference presentation. This serves as a conclusion, and a later expansion of this paper will supply the needed detail.

- Do employers view the 1% skills levy as just another tax the incidence of which they attempt to shift onto payrolls as a deduction?

- Do employers treat grant-financed skills training – grants by Setas from the levy pool - as subsidies to training expenditures? If so, are these investments not required to meet the same minimum profitability and allowance for risk that apply to other kinds of investment by the organization initiating and financing training?

- Do most employers *bet on the strong?* Do they prefer training better educated workers, the already skilled, workers higher up the job hierarchy in the firm like supervisors, men more than women? Do they shy away from training that has a remedial component for the poorly educated, workers under short-term contract, seasonal & immigrant workers? In the international literature, employers that favour the strong are overwhelmingly the case. A supportable generalisation is that more than two-thirds of national training is instigated and funded by employers in probably most industrial countries. (Felstead 2007: 4; Bassanini & Others 2005)

- Does training correlate with firm size when measured as (1) *participation rates* (the number & percentage in an organisation's labour force undergoing training in a defined period), and (2) the *intensity* of training (number of hours of training per year)? It does correlate strongly in many countries. Is this the case also in most or all sectors under the South African NSDS? We cannot say, although this seems to be the case. (Singizi Consulting 2007)

- We still do not know whether membership of a SETA successfully *inhibits* skills poaching between employers? To do so is to overcome free riding that otherwise

leads to sub-optimal training volumes because those firms willing to train cannot capture sufficient benefits for their investments when newly skilled workers are attracted away. Producers associations can inhibit poaching, most prominently documented in Germany and other continental countries. But other institutions including state action have the potential to fulfil the same function in other national occupational markets.

- No specific feature of NSDS institutional architecture is designed to facilitate & fund the *individual* worker's decision to invest in training. This is surprising given the stated prominence of re-distributive objectives in the NSDS. By contrast, in South African formal education a national student loan scheme exists for tertiary education, but there is no parallel funding mechanism for intermediate skills training. *Market failure* in capital market borrowing for training is widely recognised in the literature, although researchers like Heckman (1999) deny the seriousness of credit constraints on individual training investments in an industrial country like the US. It does not seem likely in South Africa though.

- Are employers motivated and allowed by default *not* to fulfil accreditation procedures at the end of training spells for their newly skilled workers? This limits their mobility between employers? If true, such skills remain only partially transportable and the risk to investment by the training firm is lowered. There are complex institutional & policy issues involved in this question. These include the ongoing evolution & application of SAQA standards, the functioning of NQF accreditations in the market, as well as specific lower-tier & less formalised initiatives for skills certification like RPL (recognition of prior learning). Presumably the policing performance of Setas is also directly relevant to this question.

- The more successful SETAs – in training achievements as measured by the Department of Labour indicators – like Fasset (finance & accounting), Bankseta (banking) and Inseta (insurance) deal in *high-level* skills. Much of their training effort is targeted at tertiary education graduates. Is this coincidental? Or is this relative success linked to the high formal education level of their average trainee? This question needs investigation because *intermediate* skills training - the next broad skills tier down - is where the private sector and government continue to say that the major deficiencies & bottlenecks in the training process lie currently.

- Investment in skills training is not enough by itself to generate higher productivity. Managerial innovations – production re-organisation, job redesign, employee motivation, product and marketing strategies, organizational adaptations – can be further essential *complements*. But these fall outside the design of our skills training system. If and when given strategic attention it is likely to be under industrial policy heads that are generally kept separate from skill matters. (Felstead & Others 2007; Mayhew & Neely 2006; Vignoles & Others 2004)

- Skills training is *only one* driver of increased productivity, the others being investment, innovation, enterprise & competition. To concentrate policy attention on training alone can miss much of the picture. For example, in international comparison the US is high in *level* of productivity per hour worked, as well as in

the *growth rate* of productivity since the mid-1990s. But its skills training system is not widely admired. So the explanation for ongoing US productivity performance appears to lie in the other drivers of economic growth. The following generalisations apply to OECD countries.

"[L]abour productivity in the business sector grew on average by 2.1 percent in the US during 1995-2002, in spite of the perception that education and training in that country was not on a par with Germany or Japan, which grew instead at a significantly lower rate.

We show that most workplace training is done by employers, independently of whether the accumulated skills can be transferred to other employers. On average, the entire cost of ¾ of the training courses is directly paid by employers, and there is little evidence that employees indirectly pay through lower wages. Large and innovative firms train more than small and non-innovative firms…and training increases with educational attainment [of the average worker] and the skill intensity of occupations, and decreases with age…women take more training than men, but essentially because they pay for their own training more often, while firms do not appear to accommodate their greater demand for training. Importantly, women tend to receive less employer-sponsored training than men when they are young and have more frequent career interruptions due to childrearing. On average, temporary workers get trained less often." (Bassanini & Others 2005: 6)

- Schooling attainment in aggregate clearly matters for the volume of training. This *complementarity* is shown by the average training incidence being higher in countries where the percentage of the economically active population (EAP) with at least upper secondary education is absolutely and relatively higher. Average schooling attainments vary considerably by country; for example, in the European Union early school leavers – defined as the share of the population aged 18 to 24 with only lower secondary education and not engaged in education or training – were over 20% in 2004 in Italy, Spain and Portugal, more than twice the percentage in the Scandinavian countries. There is a strong suspicion that this is part explanation for the lower levels of training in these three named countries.

  What does this mean for human capital strategies? By increasing the average quantity and quality of education, governments can *also increase* training incidence. Why? Because in the eyes of employers, skills acquisition by the better schooled work-force is perceived to be more profitable. In industrial countries one current focus is on devoting "far more resources to educating those in the bottom 40 percent of the ability range…the only effective way of raising earning power at the lower end of the distribution." (Nickell 2008: 394)

- Finally by way of illustration, to take an actual instance at the present time, why is Finland investing in training *more* than Italy, in spite of the fact that the expected wage premium (from training) is similar in both countries? The explanation may be – although not yet fully established – the fact that both the supply of and demand for trained employees is higher in Finland than in Italy. First, the supply is higher at any price in Finland because the higher quantity and quality of education there reduces training costs. Second, the demand is higher in Finland

than in Italy because of the substantially higher R&D expenditure & lower product market regulation in Finland. To be noted is that these features are independent of Finnish training practices and yet they increase the productivity of trained employees in the national labour force as a whole.

- One observation about employer motives, perhaps applicable locally, is drawn from UK discussion. If more widely true, employers' chronic complaints about skills shortages can be self-serving at root.

  Insofar as forecasts of future demand for graduates are influenced by employer statements about what they would like to recruit, it should be born in mind that they reflect *cost-free* demand whereby employers can require an ever more highly qualified set of new workers at no direct cost to themselves. Employers make very limited direct contributions to the costs of HE [higher education] (some student sponsorship and student placements)…In these circumstances, an over-supply of skills makes sense – it provides employers with greater choice of candidates and relieves employers from the need to train (at their own expense). (Keep &
  Mayhew 2004: 301-2)

- Finally, it is difficult to judge whether the following passage describes what our National Skills Development Strategy aims to be, or whether it represents a possible model with different emphases which should be taken seriously by our policy reformers? But either way, the sting is in the tail.

  If governments are mainly concerned with upgrading the skills of the workforce, an alternative levy-grant scheme that can be implemented is a system that is revenue neutral overall. All money collected by the government through a levy would be transferred back to firms – possibly after the government takes a small administration fee. Firms who train more would get back a larger proportion of funds. Under such a scheme, a firm would receive a grant not only on the basis of how much it trains, but also how much it trains relative to other firms in the economy – hence firms have an incentive to train more to keep pace with their competitors and get a larger grant. This initiative could also encourage small firms to train more. However, the drawback of putting in place such a scheme in a developing country context is similar to that of any other levy scheme – implementing such a scheme may be administratively difficult to do. (Dar, Canagarajah & Murphy 2003: 11)

Table 1: **Ways of Measuring Skills in the Adult Population**

Approach	Advantages	Disadvantages
1: Qualifications The proportions at each level (sometimes limited to degree-level and below)	Objective in nature; long-term trends available	Loose connection of academic qualifications with job skills
2: Education Length Average years of schooling, or proportions with at least x years of schooling	Objective; long-term trends available; internationally comparable	Variable quality of education, and loose link with job skills
3: Occupation The proportions in higher-skilled occupations	Easily available from labour force surveys or censuses; sometimes internationally comparable	Skills change within occupations; the hierarchy of skill among occupations is contestable and changing
4: Tests Scores from literacy and numeracy tests, such as the Skills for Life Survey, TIMSS, IALS	Objective; international comparisons sometimes possible	Narrow range of skills; expensive to administer
5: Self-Assessment Survey-based individual reports about themselves	Wide range of skills	Subjective, and skill assessment can be associated with self-esteem
6: Job requirements Sourced from commercial job analyses, expert assessments of occupations, or surveys of individuals or employers	Wide range of skills; intimately connected to jobs	Job skill requirement could differ from person skill; subjective; does not measure skills of non-employed people
7: Proxy measures Common practice is to measure skill levels by wages or wage hierarchies or by indicators of work experience	Widely available data and potentially internationally comparable	Underlying presumptions not easily tested: that high wage jobs are typically high-skilled jobs, and that earnings "returns" to work experience captures the acquisition of workplace skills

Source: Adapted from Felstead & Others (2007:5-6)

***Table 2**:* Illustrations of *perception* of skill deficiencies by sector in the UK (N = 1005)

	Static definitions (%)		Dynamic definition (%)				
	Current skills gap	Hard-to-fill vacancies	Anticipated skills problems	Continued skills problems	Emerging skills problems	Short-term skills problems	No skills problems
All	21.0	32.9	26.2	12.6	13.7	8.4	52.4
Manufacturing	23.4	40.0	34.7	16.3	18.4	7.2	47.3
Construction	27.6	30.4	31.7	14.9	16.8	12.7	47.1
Other production	16.6	18.1	11.8	7.6	4.2	9.0	78.5
Wholesale	12.2	23.9	18.7	7.1	11.6	5.1	62.7
Transport and communication	23.1	41.1	32.1	18.5	13.6	4.7	50.6
Financial	23.4	37.6	20.0	11.6	8.4	11.8	53.2
Business	22.4	22.8	24.0	13.8	10.2	8.6	59.5
Other services	16.3	40.8	31.3	1.6	29.7	14.7	39.2
Education and health (private)	14.9	50.5	20.4	10.4	10.1	4.6	40.1

Source for this table and the following two tables 3 & 4 on perceptions of skill deficiencies in the UK is Watson, Johnson & Webb (2006: 1757-1760)

***Table 3**:* Type of skill deficiencies, UK *(N = 1005)*

	Percentage of employers perceiving	
	Current skills gap	Future skills shortage
Basic literacy or numeracy skills	1.3	0.4
General communication skills	4.2	3.3
Use of English	0.9	0.4
Problem-solving skills	1.8	0.6
Basic IT skills	14.3	6.8
Software or programming skills	9.9	4.5
Knowledge of computer packages	11.5	3.8
Foreign languages	1.8	0.7
People-management skills	3.8	1.9
Strategic-management skills	0.6	0.3
Decisionmaking skills	1.7	1.4
Sales or marketing skills	7.0	2.8
Customer care	3.8	2.1
Design or development skills	1.9	1.2
Finance or accountancy skills	6.9	0.4
Technical or specialist skills	9.8	5.0
Occupational skills breakdown via different occupations	58.6	29.9

***Table 4**:* Breakdown of occupational skills: current skills gap, UK

Occupation	Current skills gap (%)
Managers and administrators	1.19
Professional	4.86
Associate professional and technical	14.66
Clerical and secretarial	7.16
Craft and related	44.84
Personal and protective service	6.91
Sales	0.68
Plant and machinery operatives	19.44
Other	0.26
Total	100.00

Table 5: Additional occupational demand *projected* for specific high-skill occupations in South Africa, 2001-2006

High-Skill Occupations	*Number in 2001*	*Percentage average annual change in number of positions, 2001-2006*	*Total new positions arising, 2001-2006*
Academics	37 327	0.5	914
Doctors	34 370	1.2	2 191
Nurses	155 516	1.2	9 934
Computer-related professionals	75 841	2.5	9 990
Scientists	4 647	1.6	388
Science technologists	4 729	0.5	126
Educators	354 469	1.4	26 417
Engineers	29 824	1.4	2 095
Engineering technologists	32 132	2.1	3 132
Managers	280 298	0.8	11 298

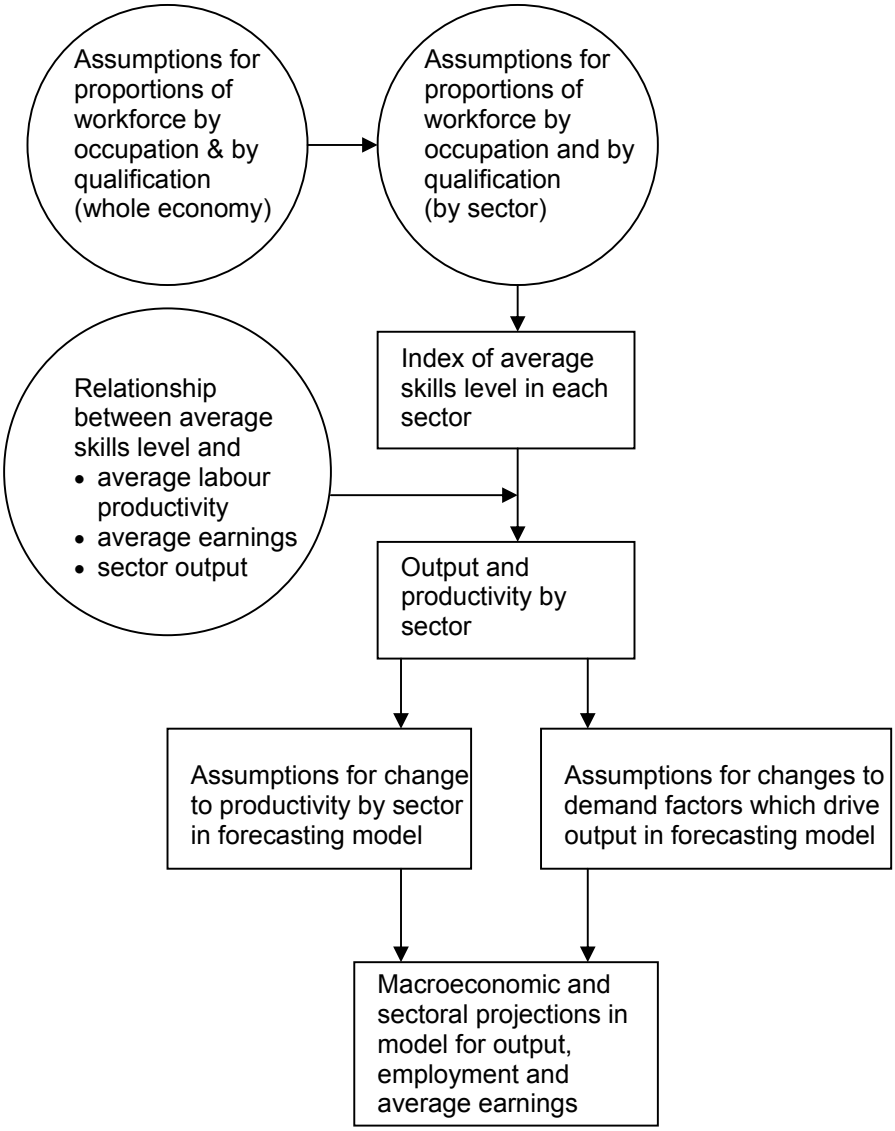
Source: Woolard, Kneebone & Lee (2003: 469)

Table 6: Number of people *projected* as needed to meet new and replacement demand in South Africa, 2001-2006

High Skill Occupations	Number in 2001	Number of workers required to meet new & replacement demand over five years.
Academics	37 327	6 651
Doctors	34 370	5 207
Nurses	155 516	35 461
Computer-related professionals	75 841	15 600
Scientists	4 647	795
Science technologists	4 729	599
Educators	354 469	73 077
Engineers	29 824	5 116
Engineering technologists	32 132	5 937
Managers	280 298	45 130

Source: Woolard, Kneebone & Lee (2003: 469)

***Figure 1**:* Logic followed to prepare skills projections (UK example)



Source: based on Beaven & Others (2005: 7)

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