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Impact of major investment projects

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Summary: This report discuss the effect - or impact of major investment projects. It contains a description and discussion of methods for ex-ante evaluation of effect (up front), and an overview over experience from some ex-post effect evaluations (after the project is finished). Evaluations show that the result of major investment projects is not always as promised by the planners and decision makers. The report discuss how to improve planning in the early phase in order to increase the probability of good estimates of future effects. An increased effort and focus on effect evaluations is recommended. It is important to build experience (especially data) to use in future analysis of major public investment projects.

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Summary

The report deals with the impact of major public investment projects. The expected impact of a project can be analyzed at different stages of a project. The purpose of impact analysis is to evaluate different project alternatives in order to provide decision support prior to final commitment to a project.

Two stages in an impact analysis are:

- Identification of which factors that will be affected by the project and estimation of the likely change of these factors
- Making a summary of the expected impact of these changes

The report begins with a short overview of methods that are used in ex-ante impact analysis. Ex-ante impact analysis deals with questions such as: "what do we think will happen?". Such analyses are used in the prioritization between projects and project alternatives. The report also includes an overview of some ex-post analyses of impact evaluations. This type of analysis addresses questions such as: "what did happen?". The ex-post analyses indicate that the actual development often is different from what was expected.

One purpose of this report to discuss and propose actions and methods that can be used in the front-end phase of projects in order to achieve reliable impact estimates. In addition, the report addresses the need for follow-up of impact estimates and the need for adjustments during the project.

The following recommendations are made regarding impact analyses:

- Compare real alternatives. Do not just provide support for a preferred alternative
- The expected impact should be described as complete as possible. Particular attention must be paid to cover as many types of impacts as possible
- The prognoses that are input to the impact analysis are subject to quality assurance and are made transparent
- A structured follow-up shall be carried out of both the chosen alternative and the zero-alternative (which is to not carry out any of the project alternatives)
- Uncertainty and the possibility for adjustments of the project shall be analyzed, communicated and followed up

It is recommended that the initiatives for ex-post follow up of ex-ante impact estimates of large governmental investments are expanded and given a high priority. One purpose of the

ex-post follow up should be to collect and structure experience data that can be used in the preparation of future projects. There is also a need to adjust the use of methods for impact evaluation so that stepwise execution of investment projects can be carried out in a suitable manner.

References

- Aune, A. (2000): Kvalitetsdrevet ledelse: Kvalitetsstyrte bedrifter, 2 utg., Gyldendal Akademiske
- Bates, J., Polak, J., Jones, P., Cook, A. (2001) 'The value of time and reliability from a value pricing experiment', *Transportation Research part E* vol. 37, pp. 191-229
- Bredrup, H. (1995): Performance measurement in a changing competitive industrial environment: breaking the financial paradigm. Doktoringeniøravhandling
- Bentham, J. (1789): An introduction to the principles of morals and legislation, London, Atlone Press
- Berg, P., Andersen, K., Østby, L-E, Lilleby, S., Stryvold, S., Holand, K., Korsnes, U., Rønning, K., Johansen, F., Kvarsvik, T., 1999. "Styring av statlige investeringer", Prosjektet for styring av statlige investeringer", Finans- og tolldepartementet
- Beuthe, M. (2002): "Transport Evaluation Methods: From Cost-Benefit Analysis to Multicriteria Analysis and the Decision Framework", in Giori, L., Parman, A.: Project and Policy Evaluation in Transport, Ashgate Publishing, Hampshire, UK
- Bokmålsordboka, Definisjons- og rettskrivningsordbok (1986): Universitetsforlaget
- Botham, R. W., (1980): "The Regional Development Effects of Road Investment", *Transportation Planning and Technology*, Vol. 6, pp. 97-108
- Braeutigam, R. B. (1999) 'Learning about transport cost', in Gomez-Ibanez, J, Tye, W. B. and Winston C (eds.): *Essays in Transportation Economics and Policy, A Handbook in Honor of John R. Meyer*, The Brookings Institution, Washington D.C.
- Brekke, K. A., (2004) Realopsjoner og Flexibilitet i Store Offentlige Investeringsprosjekter, Stiftelsen Frischsenteret for samfunnsøkonomisk forskning, Oslo
- Browne, J.; Rolstadås, A.; Andersen, B.; Devlin, J. (1997): "Performance measurement : the ENAPS approach" *International journal of business transformation. IFS International*
- Bruzelius, N. (2002) Värderingen av tid i persontrafik. 2002-02-11, Utkast 2.0
<http://www.sika-institute.se/>
- Christensen, S., Kreiner, K., (1991): Prosjektledelse under usikkerhet, Universitetsforlaget A/S, Oslo
- Crona, J.S., Antonson, H., Folkesson, L., Blomqvist, G., Balfors, B., (2003): "Blev det som det var tänkt? En internatinal kunskapsöversikt om miljöuppföljning av väg- och järnvägsprojekt", VTI meddelande 942-2003, Väg- och transportforskningsinstitutet
- Crosby, P.B., (1979): *Quality is free: the art of making quality certain*, McGrae-Hill Book Company, New York
- COWI (2002): "Brug af samfundsøkonomiske metoder i udvalgte lande", Trafikministeriet, Juni 2002

- De Brucker, K., De Winne, N., Peeters, C., Verbeke, A., Winkelmann, W. (1995) "The economic of public investments in transport infrastructure: the use of multicriteria analysis", *International Journal of Transport Economics* Vol 22, No. 2, October 1995, pp 261-281
- Deming, W. E., (1986): *Out of the crisis*, Cambridge University Press, Cambridge
- Edwards, W., Newman, J.R. (1982) "Multiattribute Evaluation"
- Eliasson, J. (2002) Förseningar, restidsosäkerhet och trängsel i samhällsekonomiska kalkyler, Underlag til ASEK-arbeidet, Transek AB, 3. mai 2002. <http://www.sika-institute.se/>
- Eikland, P.T. 2000. Teoretisk Analyse av Byggeprosesser, Samspill i byggeprosessen, prosjektnr. 10602
- Emhjellen, K. (1997): *Adapting benchmarking to project management: an analysis of project management processes, metrics, and benchmarking process models*, Doktor ingeniørvhandling
- Engebretsen, Ø.; Lian, O. & Strand. S. (1998): "Samferdsel og robuste bo- og arbeidsmarkedsregioner". TØI arbeidsdokument TR/0802/1998. Oslo: Transportøkonomisk institutt.
- Finansdepartementet (2000): *Veiledning i samfunnsøkonomiske analyser*, Statens forvaltningstjeneste, Finansdepartementet, Oslo
- Flyvbjerg, B., Bruzelius, N. and Rothengatter, W. (2003): *Megaprojects and Risk. An Anatomy of Ambition*. Cambridge: Cambridge University Press.
- Flyvbjerg, B.; Holm, M. S. and Buhl, S. (2002): "Underestimating Costs in Public Works Projects: Error or Lie?" *Journal of the American Planning Association*, Vol. 68, No. 3, pp. 279-295.
- Flyvbjerg, B.; Holm, M. S. and Buhl, S. (2004): *How (In)accurate Are Demand Forecasts in Public Works Projects? The Case of Transportation*. Draft paper in progress.
- Folkesson, L., (1999): "Uppföljning av natur-miljöeffekter i MKB för väg- och järnvägsprojekt: Utgångspunkter och uppläggning" VTI meddelande 880-1999, Väg- och transportforskningsinstitutet
- Fridstrøm, L. (1992): "'Stated preference' – eller økonomi som eksperimentalvitenskap", *Sosialøkonomen*, nr 2 1992, pp18-23
- Gottschalk, P., Wenstøp, F., (1988): *Kvantitativ beslutningsanalyse for ledere og planleggere* Oslo: Universitetsforlaget
- Grøvdal, A and Hjelle H. M. (1999) *Innføring i transportøkonomi*, Fagbokforlaget, Bergen, -Sandviken, Norway
- Gyldendals ett-binds leksikon, femte utgave (1973): Gyldendal Norsk Forlag
- Hall, P., (1980): *Great Planning Disasters*, Weidenfeld and Nicolson, London.
- Harrison, E. F. (1995): *The Managerial Decision-Making Process*, Houghton Mifflin, Boston
- Havneavisen, (2001): www.havneavisen.net

- Holm, S. M. K., (2000): "Economic Appraisal of Large Scale Transport Infrastructure Investments", Ph.D Thesis submitted to Aalborg University
- Hronec, S. M. (1993): "Vital signs: using quality, time and cost performance measurement to chart your company's future", AMACOM /American Management Association, New York, 1993
- Husby, O., Kilde, H., Klakegg, O.J., Torp, O., Berntsen, S. og Samset, K. (1999): "Styring av usikkerhet i prosjekter", Norsk senter for prosjektledelse
- Ishikawa, K., (1985): What is Total Quality Control? The Japanese Way, Prentice Hall, New York
- Jernbaneverket (2001a): Metodehåndbok JD 205, Samfunnsøkonomiske analyser for jernbanen
- Jernbaneverket (2001b): Jernbanestatistikk 2000
- Jernbaneverket (2003) Jernbanestatistikk 2002
- JBV Utredning (2004): Utviklingen i persontrafikken på jernbanen. En analyse av årsakene til nedgangen i trafikken i perioden 2000-2003, Jernbaneverket, Oslo, September 2004
- Johansson, B., (1993): "Infrastructure, Accesibility and Economic Growth", International Journal of Transport Economics, Vol. 20, No. 2, pp. 131-156
- Juran, J.M. (1988): Juran's Quality Control Handbook, McGraw-Hill, USA
- Lam, T. C., Small, K. A. (2001) 'The valuation of reliability for personal travel', Transportation Research part E vol. 37, pp. 231-251
- Klakegg, O. J. (2004): Målformulering. Concept-rapport nr. 1050-2. NTNU, Trondheim
- Kreiner, K., (1995): In Search of Relevance: Project Management in Drifting Environments, Scandinavian Journal of Management, Vol. 11., No. 4, pp 335-346.
- Kornai, J., (1979): "Appraisal of Project Appraisal", Economics and Human Welfare: Essays in Honour of Tibor Scitovsky", edited by Boskin, M.K.,pp75-99, , New York, Academic Press
- Lichfield, N., Kettle, P., Whitbread, M. (1975): Evaluation in the Planning Process, Pergamon Press
- Lichfield, N., (1996): Community impact evaluation, UCL Press, London, UK
- Lind, H. (1978): "Två jämförelsesmetoder: Måluppfyllelsesanalys och Lichfield's planning balance-sheet method", NU B 1978:3
- Lindblom, C.E. (1959): "The Science of Muddling Trough", Public Administration Review, Vol 19
- Mackie, P., Nellthorp, J., (2003) "Transport Appraisal in a Policy Context" in Perman, A., Mackie, P., Nellthorp, J., (eds.): Transport Projects, Programmes and Policies, Hampshire, Ashgate Publishing
- Madslie, A., Minken, H., (1995): Nyttekostnadsanalyse av utbedring av Risøyrenna Oslo, 1995. Transportøkonomisk institutt, rapport nr 1000/95

- March, J. G., (1994). A Primer on Decision Making: how decisions happen, The Free Press, Macmillan, Inc, New York, N.Y
- Meier, W., Heimerl, G. (1985) Evaluation of traffic investments: Problems and proposed solutions
- Miller, R., Lessard, D., (2000):. The Strategic Management of Large Engineering Projects, Shaping institutions, Risks and Governance, Massachusetts Institute of Technology, USA.
- Mintzberg, H., (1994):. The Rise and Fall of Strategic Planning, Prentice Hall International.
- Minken, H., Eriksen, K. S., Samstad, H., Jansson, K. (2000): "Nyttekostnadsanalyse av kollektivtiltak, Kort oversikt", TØI rapport 474/2000, Transportøkonomisk institutt, Oslo
- Morris, P.W.G., Hough, G.H. 1991. "The Anatomy of Major Projects. A Study of the Reality of Project Management", John Wiley and Sons, Chichester, UK
- NKI's leksikon i farger (1979): NKI-forlaget, Stabekk / Elsevier, Amsetrdam
- NOU 2004:2: Effekter og effektivitet: Effekter av statlig innsats for regional utvikling og distriktspolitiske mål. Statens forvaltningstjeneste
- NOU 2002:19: Avfallsforebygging: En visjon om livskvalitet, forbrukerbevissthet og kretsløpstenkning, Statens forvaltningstjeneste
- NOU 1997:27: Nytte-kostnadsanalyser, Prinsipper for lønnsomhetsvurderinger i offentlig sektor, Statens forvaltningstjeneste
- NOU 1999:28: Gardermoprojektet, Evaluering av planlegging og gjennomføring, Statens forvaltningstjeneste
- NOU 1998:16, Nytte-kostnadsanalyser, Statens forvaltningstjeneste
- NSB (1986): "Dobbeltsporet Ski-Moss", Utredningsoppdrag nr. 112, Oslo, mars 1986
- NSB (1992) "Modernisert Vestfoldbane Drammen-Skien", Jernbaneutredning Hovedrapport, NSB Konsernstab strategi og miljø, november 1992
- Nyborg, M. (2002): Miljø og nytte-kostnadsanalyse. Noen prinsipielle vurderinger. Rapport 5/2002. Stiftelsen Frischsenteret for samfunnsøkonomisk forskning, Oslo. http://www.frisch.uio.no/pdf/rapp02_05.pdf
- Nyborg, K. og Spangen, I. (1996). Politiske beslutninger om investeringer i veger. TØI-notat 1026/1993. Oslo: Transportøkonomisk institutt
- Næss, P. (2004a): Bedre behovsanalyser. Erfaringer og anbefalinger om behovsanalyser i store offentlige investeringsprosjekter. NIBR-rapport 2004:15. Norsk institutt for by- og regionforskning, Oslo.
- Olsson, N.O.E., Haugland, H., (2004a): "Influencing factors on train punctuality - results from some Norwegian studies", Transport Policy Vol. 11, No. 4, pp 387-397
- Olsson, N.O.E. (2004b): "Flexibility in Engineering Projects: Blessing or Curse?", Nordnet International project management conference, 29.9-2.10. 2004, Helsinki, Finland

- Olsson, N.O.E. (2004c): "Management of Flexibility in Large Engineering Projects", under utarbeidelse, Institutt for bygg, anlegg og transport, Norges Teknisk-Naturvitenskapelige Universitet
- Parsons, W (2002): "Analytical Frameworks for Policy and Project Evaluation: Contextualising Welfare Economics, Public Choice and Management Approaches", in Giori, L., Parman., A.: Project and Policy Evaluation in Transport, Ashgate Publishing, Hampshire, UK
- Pearce, D., Barbeir, E., Markandya, A., (1990): Sustainable Development: Economics and Environment in the Third World, Edward Elgar Publishing, Hants, UK
- Pyddoke, R. (2003) Hur känsliga är järnvägsinvesteringars lönsamhet om de antaganden som görs om pris, restid och turtäthet inte realiseras? 2003-04-01. <http://www.sika-institute.se/>
- Riksrevisjonen (2001): "Riksrevisjonens undersøkelse av regjeringens gjennomføring av Handlingsplan for atomsaker", Dokument nr. 3:9 (2000-2001)
- Sager, T. (1991): Planlegging med samfunnsperspektiv. Analysemetode. Trondheim: Tapir forlag.
- Samset, K., (2003). Project Evaluation: Making Investments Succeed. Tapir Academic Press, Trondheim
- Samset, K., 2001. "Prosjektvurdering i tidligfasen - Fokus på konseptet", Tapir akademisk forlag, Trondheim, Norway
- SIKA (2000): "Uppföljning av investeringar" SIKA-rapport 2000:11. <http://www.sika-institute.se/>
- SIKA (2002a): "Översyn av samhällsekonomiska metoder och kalkylvärden på transportområdet". SIKA-rapport 2002:4. <http://www.sika-institute.se/>
- SIKA (2002b): "Tid och kvalitet i persontrafik". SIKA-rapport 2002:8. Desember 2002 <http://www.sika-institute.se/>
- SIKA (2003): "Uppföljning av de transportpolitiska målen, Maj 2003" SIKA-rapport 2003:5. <http://www.sika-institute.se/>
- SIKA (2004a): "Uppföljning av de transportpolitiska målet och dess delmål, Maj 2004" SIKA-rapport 2004:3. <http://www.sika-institute.se/>
- SIKA (2004b): "Mått för måluppföljning: Tänkbara mått för de transportpolitiska delmålen om tilgjænglighet, regional utveckling och transportkvalitet. Lägesrapport Persontransporter" SIKA-rapport 2004:5. <http://www.sika-institute.se/>
- Simon, H.A. (1957): Models of Man, John Wiley, London
- Skamris, M. K., (1994): "Large Transport Projects – Forecast Versus Actual Traffic and Cost", Master thesis in International Technology Planning, Aalborg University
- Skamris, M. K., Flyvbjerg, B., (1997): "Inaccuracy of traffic forecasts and cost estimates on large transport projects", Transportation Policy, Vol. 4, No 3, pp. 141-146
- Small, K. A and Winston, C.(1999):" The Demand for Transportation: Models and Applications", in Gomez-Ibanez, J, Tye, W. B. and Winston C (eds.): Essays in Transportation Economics and Policy, A Handbook in Honour of John R. Meyer, The Brookings Institution, Washington D.C, 1999

- Small, K. (1999): "Project evaluation" in Gomez-Ibanez, J, Tye, W. B. and Winston C (eds.): Essays in Transportation Economics and Policy, A Handbook in Honour of John R. Meyer, The Brookings Institution, Washington D.C
- Standal, M., Johansen, A., (2002) Målanalyse, Prosjekt- og TeknologiLedelse AS. Trondheim, februar 2002.
- Statens Vegvesen (1995): "Konsekvensanalyser, Del I, Prinsipper og metodegrunnlag" Håndbok-140, Vegdirektoratet
- St.meld. nr. 35 1992-93. Norsk Jernbaneplan 1994-97
- St.prp. nr 1 1992-1993
- St.prp. nr 1 1993-1994
- St.prp. nr 1 1995-1996
- St.prp. nr 1 2001-2002
- Sælensminde, K. (2000): 'Reisetid, miljøkonsekvenser og trafikksikkerhet verdsettes trolig for høyt', Samferdsel nr. 7, 2000
- Sælensminde, K. (2003): "Embedding effects in valuation of non-market goods", Transport Policy 10, pp 59-72
- Vedung, E. (1991): Utvärdering i politik och förvaltning. Lund: Studentlitteratur
- Vegplanutvalget (1979): "Retningslinjer 5, Sammenlikningsmetoder", NVP II, Vegplanutvalget for byer og tettsteder, Norsk Vegplan II, Oslo, desember 1973
- Viste, J. O. (1979): "Hva er konsekvensanalyse? Spørsmål som reiser seg ved krav om konsekvensanalyse". NIBR-rapport 9/9, Norsk institutt for by- og regionforskning, Oslo
- Whist, E., Bergsland, K. H., Jordanger, I., Ore, K. M., Øvrebø, T. (2001). Evaluering av NHR-prosjektet, Samferdselsdepartementet
- Wardman, M. (2001) 'A review of British evidence on time and service quality valuations', Transportation Research part E vol. 37, pp. 107-128
- Wardman, M. (1998) "The Value of Travel Time A review of British evidence", Journal of Transport Economics and Policy Vol. 32, part 3, pp. 285-316
- Yin, R.K., Case study research: Design and Methods, Sage Publications, 2003