



Appendix G

Graphics

Troubleshooter's Guide

As noted in Chapter 7, there has been little progress in developing authoritative guidance on graphical presentations, either in Canada or in other countries. Nevertheless, practical guidance is needed to provide uniformity in the design of graphics and to avoid the inadvertent use of misleading graphics in corporate reports.

Appendix F offers practical guidance by providing a *Graphics Checklist*. This Appendix supplements that guidance by providing a *Graphics Troubleshooter's Guide*. In addition, a stand-alone booklet entitled *Practical Guidance for Preparing Graphics* has been prepared. As a companion to this Research Report, the booklet sets out basic principles and best practices for preparing graphics. It will help management ensure that graphics are accurately and effectively portrayed in a way that investors and other stakeholders reading corporate reports can easily understand.

Graphics Troubleshooter's Guide

	Characteristic	What to look for	Additional comments	
1	Visual appeal; ease on the eyes	<ul style="list-style-type: none"> • Legible text; • Compatible colours; • Sufficient contrast; • Not “busy;” • Do not exaggerate columns, bars or spacing or make them too narrow. 	<ul style="list-style-type: none"> • No flashing effect; • Sensitivity to colour impairment concerns; • Background preferably white, otherwise lightly shaded; • Avoid too much detail—use a separate graphic(s). 	A graph that is hard on the eyes does a disservice to the reader, the data and the organization. Some colour combinations (e.g., red text on a blue background) are difficult to read. Colour choices should avoid common forms of colour impairment.
2	Freedom from clutter and pointless effects	<ul style="list-style-type: none"> • No meaningless 3-D; • No shadows. 	<ul style="list-style-type: none"> • Decoration that does not interfere with data. 	3-D is rarely beneficial and often creates confusion. 3-D makes grid lines hard to relate properly to the bars or other elements. Heights are difficult to compare because bases are at different positions.
3	Graph elements in proportion to numbers	<ul style="list-style-type: none"> • No distortion; • Correct plotting to scale; • No truncation. 	<ul style="list-style-type: none"> • Special care with non-zero baseline graphs, which should be avoided. 	Drawing elements in proportion to the corresponding numbers is the fundamental idea underlying graphs. Measurement errors undercut this. Non-zero baselines throw graph elements out of proportion with the data.
4	Zero easy to find	<ul style="list-style-type: none"> • Zero baseline prominently marked as such; • Position of baseline unambiguous. 	<ul style="list-style-type: none"> • Avoid non-zero baselines; • Any negatives must be clearly marked and handled consistently in groups of graphs. 	Zero is one of the most important numbers in mathematics and in most graphs. Only by knowing the location of zero can the reader judge proportions. (See also 3 above.)
5	Clear, helpful scales and grids	<ul style="list-style-type: none"> • Quantities shown on axes to indicate scale; • Gridlines and tick marks at sensible intervals; • Logarithmic scales readily apparent. 	<ul style="list-style-type: none"> • Avoid dual scales to the extent possible, can be confusing; • Gridlines and tick marks visible but not overpowering the data; • If no gridlines, put numbers at top of column or line, or end of bar. 	Gridlines and tick marks are particularly helpful, especially in graphs that do not label individual values (such as, in some cases, columns and bars). However, they are confusing if they are at peculiar intervals such as 0.55 or 13. This is a common shortcoming, both in graphs that label gridlines and those that do not. In many 3-D graphs, gridlines are in front of the bars at the baseline, and in back elsewhere. Pure visual nonsense.

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	Characteristic	What to look for	Additional comments	
6	Struggle-free legends (keys) and labels	<ul style="list-style-type: none"> Legends in same sequence and orientation as corresponding graph elements. 	<ul style="list-style-type: none"> Labels easy to relate to specific elements; Sensible gridline intervals (see item 5, above). 	As well as being legible, labels must be easy to associate with the element being identified. This usually demands proximity. Keeping labels and keys in the same order as the elements of the graph greatly reduces the reader's effort. Pie charts are prone to labelling failures.
7	Appropriate precision	<ul style="list-style-type: none"> Thin lines for accurate data. 	<ul style="list-style-type: none"> Thicker, but less precise, lines for approximations. 	Plots become difficult to read if fat lines are used. Should one read the top of the line, the bottom, or the middle? On the other hand, using precise-looking graphs for estimates gives a false impression of accuracy.
8	Comparability	<ul style="list-style-type: none"> Scales consistent between graphs, if possible; if not, differences clearly visible. 	<ul style="list-style-type: none"> If non-zero baselines used, same proportion of each graph removed; Scales consistent in a graph. 	Putting two or more graphs together demands care. Wherever possible, scales, colour coding and other features should be compatible. If different scales must be used, visual cues such as gridlines being at different separations, helps readers avoid false comparisons.
9	Pies: free of the usual traps	<ul style="list-style-type: none"> Circles only; no ellipses, squares or fish; Slices meeting in the geometric centre, then clockwise in size order; No more than 5 segments; No more than 1 or 2 exploded slices. 	<ul style="list-style-type: none"> Special attention to labels and keys; Not normally suitable for comparisons between graphs. 	Non-circular pie charts make slices hard to compare. Pie charts are especially prone to problems with labels and keys. Comparisons among pie charts are difficult (because elements rotate); stacked bars are better.
10	Conventions observed	<ul style="list-style-type: none"> Time series should flow from left to right or top to bottom (for bar charts). 	<ul style="list-style-type: none"> Scales consistent everywhere in the graph. 	Some situations may justify non-conventional approaches, but these must be clearly marked. Text labels (e.g., showing earlier years on the right or, for bar charts, at the bottom) are not sufficient for this purpose.
11	Integration with text	<ul style="list-style-type: none"> Graphs near relevant text. 	<ul style="list-style-type: none"> Headings, arrows, etc. to link graph with text. 	Some people read graphs first, and may seek more information in the text. Others start with the text. The document design should facilitate these links. Terminology should be consistent.

The "Graphics Troubleshooter's Guide" was prepared by Alan Davis, PricewaterhouseCoopers LLP.