

# The Predictable Future Of Medical Device Technology

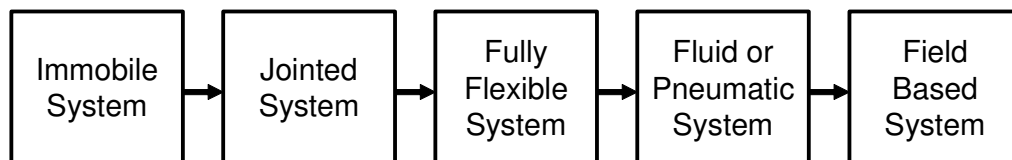
Darrell Mann, Systematic Innovation

Try this thought experiment. Take one of your current products and think back to the time before the product or its predecessors existed. Now think about the very first prototype of the very first generation of those predecessors and from there think about all of the different variations and improvements that have taken place in the design and function of the product. Place all of these different designs along a time-line and what you are likely to see is a progression of gradual improvements, followed by occasional 'big-leap' advances, followed by a series of gradual improvements, followed by another big leap, and so on.

Now extend the thought experiment to any other product type and do the same thing. Chances are, whatever it is you picked – from a stent to a toothbrush to a dialyser to a bar of chocolate – you will observe the same thing; a long series of gradual improvements punctuated by occasional step-change leaps.

Okay, now the difficult bit. Now you need to imagine that someone has done precisely this job for every conceivable type of product or process, across every field of human endeavour. Close to three million analyses in fact. All the time looking at those step-change advances, and all the time looking to see if there are any jump patterns that repeat across different industries. This task has in fact been going on since 1946. It turns out that there are indeed a number of step-change jump patterns that very faithfully repeat across every different industry.

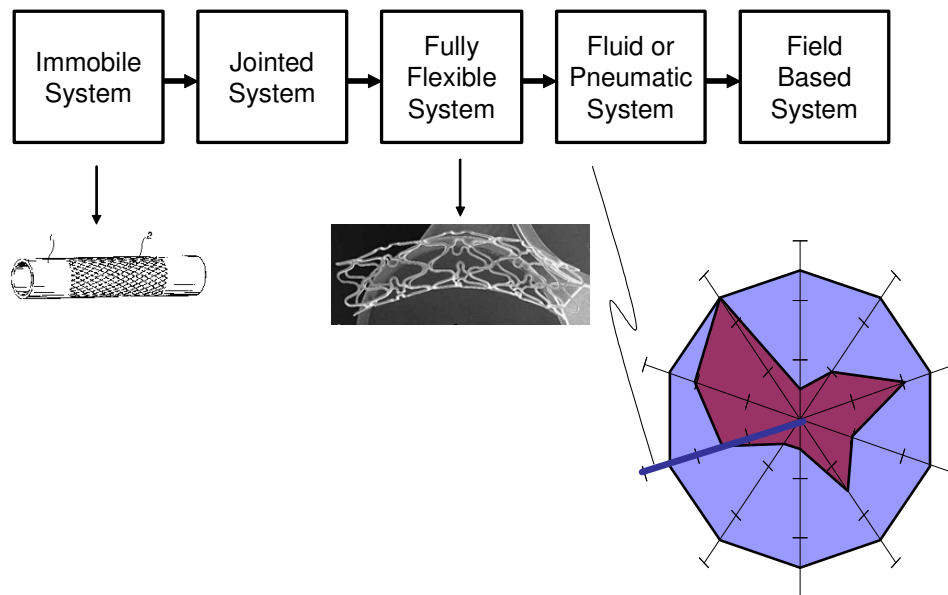
By way of example, the figure below illustrates one of the step-change innovation patterns. This pattern relates to the ways in which products or processes move. Hence we see the first stage of the pattern is when something is not moving. Then we get movement by adding joints and then using flexible constructions, then moving away from a mechanical structure to one that uses a fluid, and from there to the use of some kind of 'field' – where field could be gravity or electrical or ultrasound or a laser, etc. We can see many examples of this step-change pattern in action across many different industries – from automotive steering systems to body armour, from cutting implements to stents. Sometimes systems might miss stages out – for example the jump from a scalpel (immobile) to laser surgery (field) – and sometimes they might temporarily have to go backwards to allow an advance along a different evolution pattern, but the overall repeatability and applicability is almost uncanny.



What the research has also shown is that some products and some industries are further advanced along certain of the step-change patterns than others. Let's think about that for a minute: If that is true, then it might have some very important things to say about your current products and processes. In particular it has something to say about where they are likely to jump in the future. A step-change innovation that has already taken place in, say, the aerospace, may, in other words, offer you vital strategic information on where your product is going to evolve next. Now, if that's true – that you might be able to predict step-change

future innovations in your product – it ought to have an impact on the way you think about (and protect) your future.

In order to start doing something meaningful with this step-change pattern idea, we need to introduce the concept of ‘evolution potential’. We also need a way to bring together all of the different patterns that exist (35 have so far been uncovered – although the research continues to see if there are more). The figure below illustrates a way to do this. Each spoke on the radar plot represents one of the step-change patterns, and each step along the spoke, therefore, represents one of the known jumps along each pattern. So, by comparing any given product or process to each of the patterns it is possible to show its currently evolutionary state relative to a global standard of innovative best practice. The stent, to stick with that example for a moment, has so far advanced along four of the six jumps in the earlier ‘movement’ step-change pattern. The first generation stent featured a longitudinal axis that was indeed ‘immobile’, but then as time progressed and the science of stent design advanced, joints were added to make insertion easier, and now we have designs that have a completely flexible form. Note though that there are two evolution stages that have not as yet been utilised. The message from the pattern is thus quite clear; the future of the stent lies in the direction of a non-mechanical solution of some kind.



Stents aside, what we do on the facing page is show the results of an evolution potential analysis of some of the most interesting medical device products featured in this publication in the last 12 months. In each case the radar plots show how far along each of the step-change innovation patterns that particular product has evolved. Without getting too far into the details of what each of the plots means for each of the products, what the overall page shows is that there is considerable untapped evolution potential in every single one of the featured products.

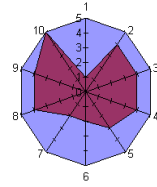
This ‘untapped potential’ is your future. It is both threat and opportunity. If the trends are right (and we spend every minute of every day so far failing to find exceptions), then either you or your competitors has the chance to gaze into the future and see what has not yet been seen. Call it the voice of the product if you will; the jumps that have taken place in other industries are trying to tell your product where it wants to evolve to in the future. *When* it is going to make these jumps is another issue for another article. In the meantime we leave you with the thought, that irrespective of the timing of these jumps, you can see what they are,

and, if you see it before your competitors, you can do the necessary to make sure you own your own destiny.

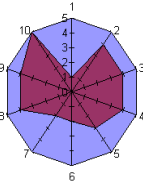
*To find out more about the step-change patterns, evolution potential and your products visit [www.systematic-innovation.com](http://www.systematic-innovation.com) or contact Peter Livesey on 01494 881453.*



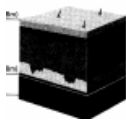
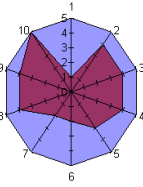
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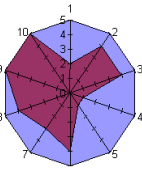
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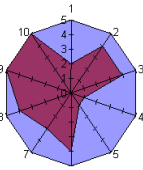
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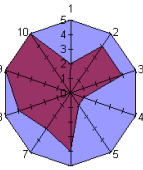
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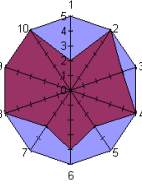
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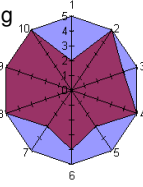
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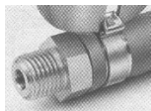
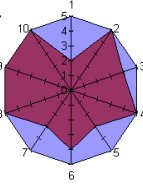
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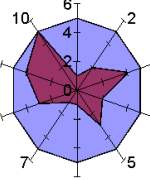
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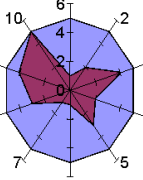
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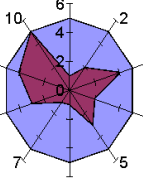
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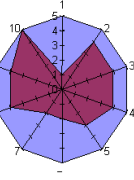
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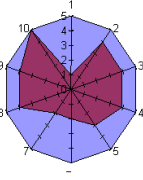
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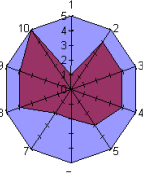
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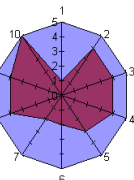
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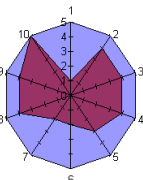
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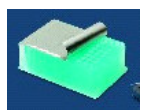
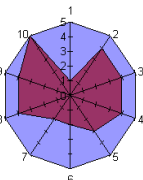
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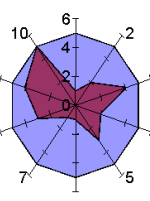
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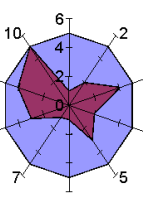
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